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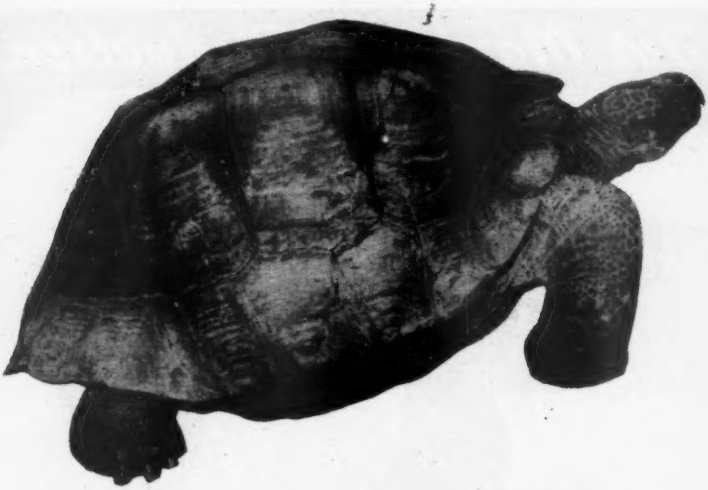

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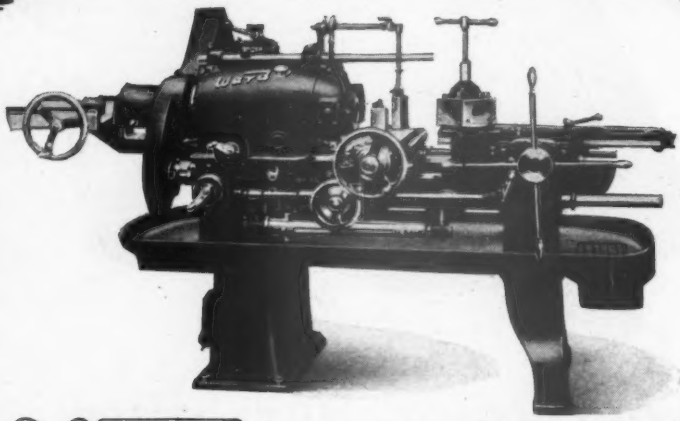

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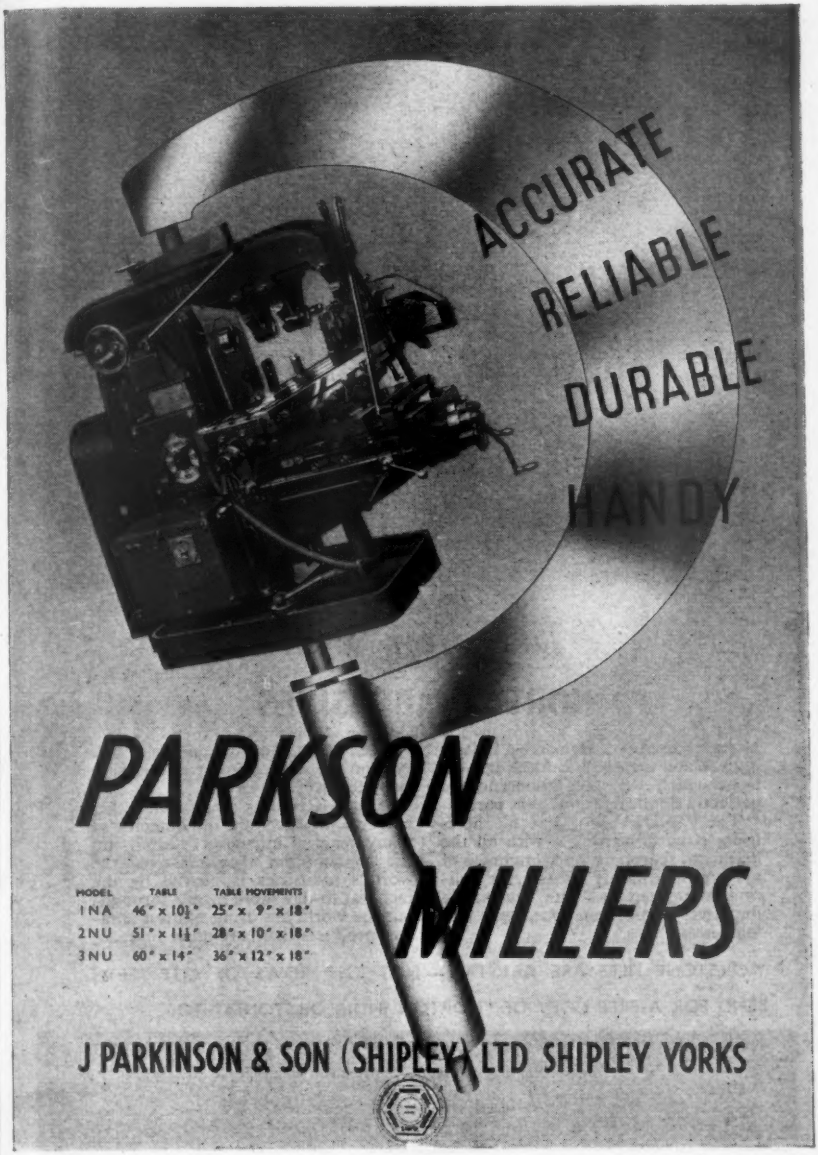
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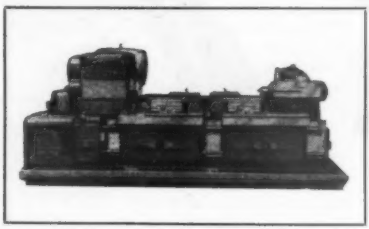

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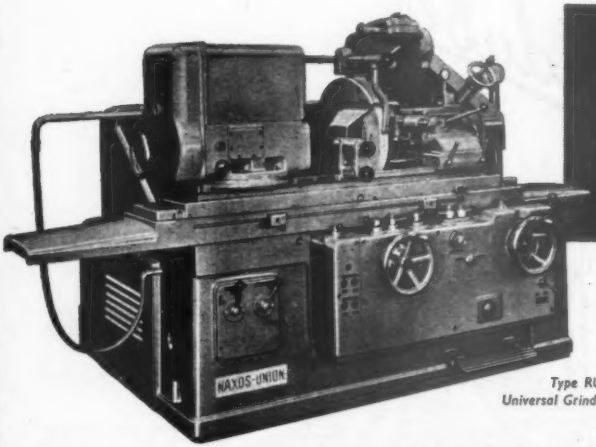


R300 TYPE

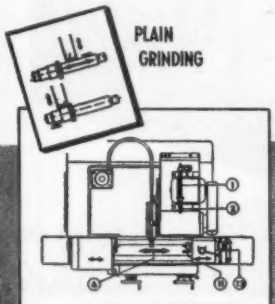
six machines

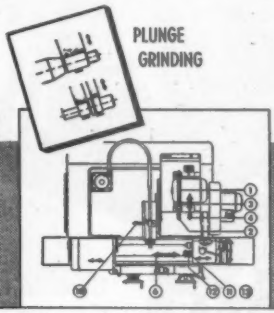
Type RU300
Universal Grinding Machine

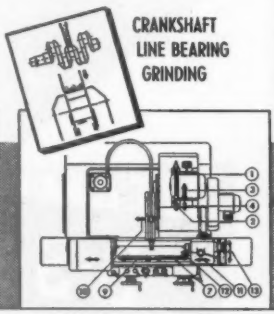
RG300 Plain Grinder. The basic machine of the series, fitted with hand feed only to wheel-head and work-table. Provided with a fine feed and fast table traverse (five times), the machine is particularly suitable for small batch work of simple character.

RE300 Plunge Grinding Machine. Employs wide or multiple wheels. Hydraulic movement to grinding head with fast approach, fine feed, and fast return. Dual control axial adjustment for grinding to shoulders. Hand table traverse (two speeds). Fine diameter control. Hydraulic tailstock withdrawal.

RM300 Crankshaft Line Bearing Grinding Machine. Similar in design to Type RE300, but arranged to carry a thinner but larger grinding wheel. Hydraulic table movement for quick indexing from bearing to bearing. Interlocked controls obviate incorrect operation.







BLACK ARROWS Automatic hydraulic movement.
OPEN ARROWS Hand adjustment.
THIN ARROWS Possibility of adjustment.

1. Hand movement of the grinding spindle head.
2. Fine adjustment by hand.
3. Hydraulic quick adjustment of the grinding spindle head.
4. Hydraulic plunge-cut motion.
5. Automatic fine adjustment during longitudinal grinding.
6. Table hand movement, one speed.

WICKMAN *of* COVENTRY

NAXOS UNION

CYLINDRICAL GRINDING MACHINES

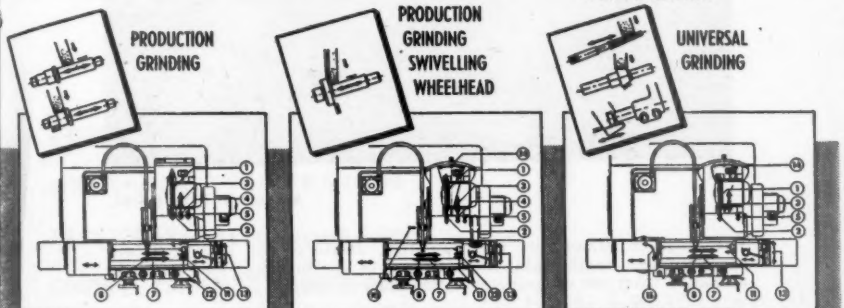
developed from one basic type, and unit built

The R300 series of standard machines, utilising various unit mechanisms in combination, meet a wide variety of production grinding applications in the most economical manner. In addition to these standard types, machines can be supplied with different combinations of mechanisms to meet special conditions.

RP300 General Purpose Grinding Machine. Hydraulic grinding head movement and automatic hydraulic table traverse with automatic reversal. For grinding long workpieces with traversing table, and for automatic plunge-cut grinding. Tailstock hydraulically operated.

RS300 General Purpose Machine with Swivelling Grinding Head. Similar to RP300, fitted in addition with a swivelling grinding head with axial adjustment. Suitable for plunge grinding short length tapers and tangent grinding the sides of collars or faces.

RU300 Universal Grinding Machine. In addition to the features of the basic type this model has automatic longitudinal movement of the table, swivelling wheel-head and work-head, and internal grinding attachment. Suitable for all grinding work on cylindrical or tapered components of toolroom character.



7. Table hand movement, two speeds.
8. Hydraulic table movement with reversal.
9. Hydraulic fast motion of the table.
10. Axial movement of the grinding spindle.
11. Return motion of the tailstock spindle sleeve by hand.
12. Hydraulic return motion of tailstock spindle sleeve.
13. Table can be swivelled.
14. Grinding spindle head can be swivelled.
15. Component spindle head can be swivelled.

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for faster production on wire cutting, stripping and measuring

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SIMPLE, COMPACT, RUGGED DESIGN

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2 sizes: Capacity up to $\frac{5}{16}$" dia. drill or $\frac{1}{2}$" dia. drill respectively.

● *Early delivery*

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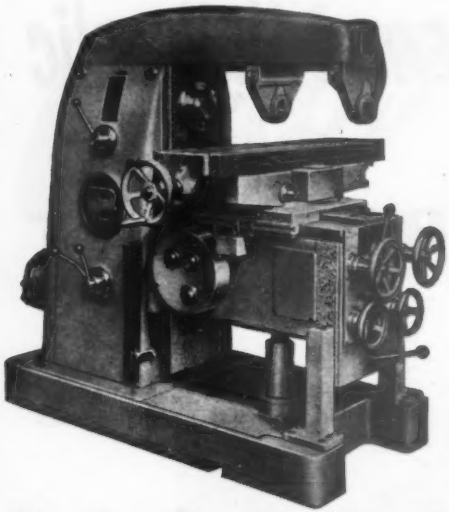

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Table Dimensions
44″ × 11½″ to 70½″ × 16½″
Longitudinal Traverses
27¾″ to 44″
Cross Traverses 9¾″ to 14¾″
Vertical Traverses 16¾″ to 17¾″
Spindle Speeds - - 18
Spindle Speed Range
30 - 1,500 r.p.m.
Quickly detachable Feed Box

Sole British Agents

SYKES *machine tool company limited*

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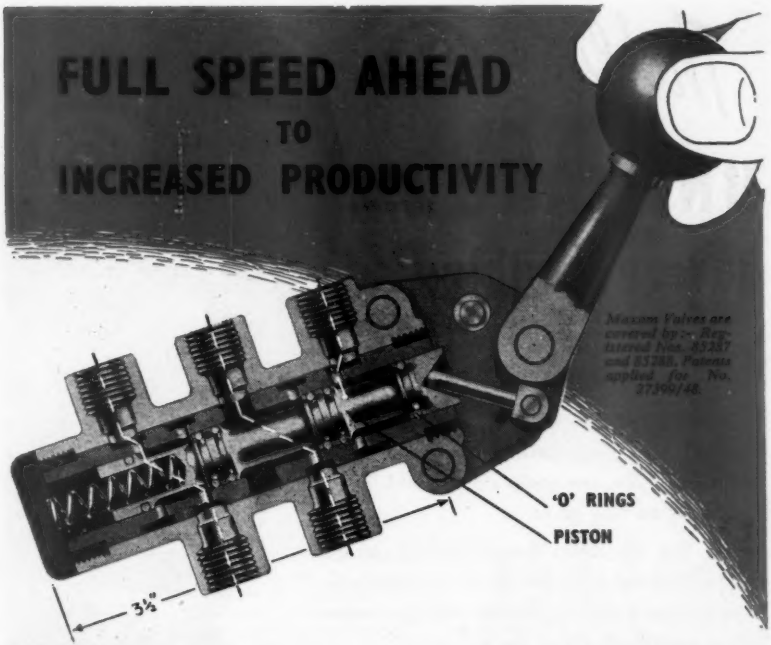
SLOANE 2272 (3 lines)

FULL SPEED AHEAD TO INCREASED PRODUCTIVITY



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Compressed air power solves many problems—

★ **SIMPLIFIES** *Jigs, fixtures and machines*
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★ **SAVES** *TIME - MANPOWER - MONEY*

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VALVES AND CYLINDERS

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THE MODERN WAY TO FASTER PRODUCTION

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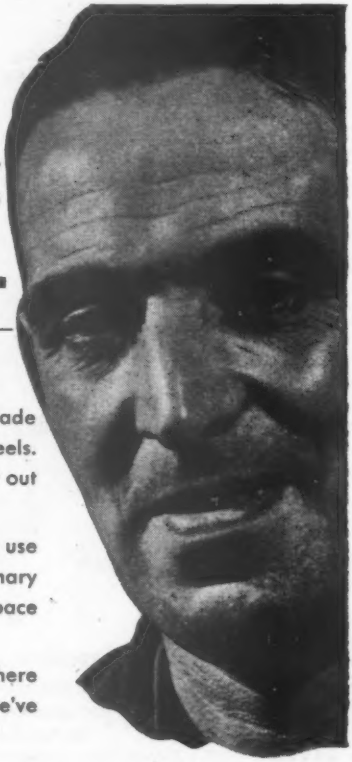
UNBRAKO socket screws have everything . . .



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They're mighty tough . . . they're made from the toughest nickel chrome alloy steels. They fit flush, are easily started and lift out as easy as they go in.

This toughness means that we can use one **Unbrako** screw where two ordinary screws used to go—see the saving on space and material?

We put them on all kinds of jobs where there's a lot of stress and we've never been let down yet."

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JIGS, FIXTURES,
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Motor car gearbox Drilling Fixture

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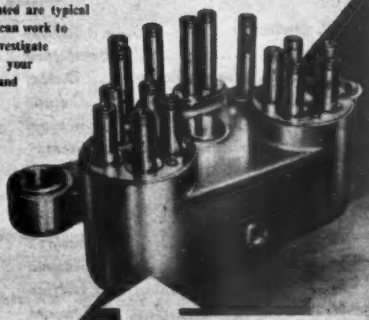
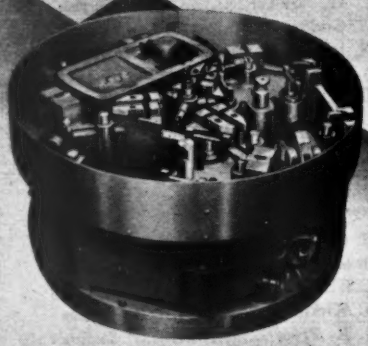


Jig for multiple drilling machine

Continuous Milling Fixture for automobile steering gear cover



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Southern	J. W. Taylor, 44, Deacon Road, Bitterne, Southampton.
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South Wales and Mon.	W. D. Porter, 49, Kyle Avenue, Rhiwbina, Cardiff.
Stoke-on-Trent Sub-Section	R. Rowley, North Staffordshire Technical College, Stoke-on-Trent.
Western	A. Eustace, 19, Ferndale Road, Northville, Bristol, 7.
West Wales Sub-Section	H. P. Sanderson, I.C.I. Ltd. (Metals Division), Waunarlwydd, Nr. Swansea.
Wolverhampton	W. J. Marshall, Central View, Norton-in-Hales, Shropshire.
Yorkshire	J. L. Townend, 26, Moor Allerton Drive, Street Lane, Leeds, 7.

CORRESPONDING MEMBER IN THE MIDDLE EAST

J. Merkine, 45, Arlozoroff Street, Ramat-Gan, Israel.

GRADUATE SECTION HONORARY SECRETARIES

Birmingham	W. Silberbach, 44, Linwood Road, Handsworth, Birmingham, 21.
Coventry	C. J. Emery, 88, Woodside Avenue, Green Lane, Coventry.
Halifax	J. Taylor, 32, Hill Top Road, Paddock, Huddersfield.
Liverpool	E. A. Hewitt, 121, North Barcombe Road, Liverpool, 16.
London	R. T. Mustard, 47, King's Road, Woodham, Weybridge, Surrey.
Luton	C. S. Brewer, 44, Beverley Road, Luton, Beds.
Manchester	G. H. Armes, 14, Fairmile Drive, East Didsbury, Manchester, 20.
North Eastern	L. Walmsley, 7, Wellesley Terrace, Newcastle-upon-Tyne, 4.
Western	C. H. Spearing, Severn View, Easter Compton, Nr. Bristol.
Wolverhampton	W. L. Pace, "Linden" 10, Ezekiel Lane, Short Heath, Willenhall, Staffs.
Yorkshire	J. Freel, 27, Roundhay Grove, Leeds, 8.

THE JOURNAL OF

THE INSTITUTION OF PRODUCTION ENGINEERS

Vol. 31, No. 3, March 1952

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The Institution of Production Engineers does not accept responsibility for any statements made or opinions expressed in any papers published in the Journal of the Institution.

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Death of KING GEORGE VI

A TELEGRAM was sent to Her Majesty the Queen conveying to her the sympathy of the President and members of the Institution, and assuring her of their continued loyalty and devotion.

Her Majesty was graciously pleased to reply.

Bureau d'Ingenieurs-Conseils

MEMBERS will be very appreciative of the following letter which has been received at Head Office:

Bureau d'Ingénieurs-Conseils G. Gombert

ETUDE DES PROBLEMES TECHNIQUES DE LA PRODUCTION
INDUSTRIELLE ET MINIERE

TELEGRAMMES
INGECOMBER
TELEPH. 11.81.80
12 LIGNES

SIEGE CENTRAL
22, RUE DU MUSEE
BRUXELLES

February 11th 1952

Institute of Production Engineers
36 Portman Square
London W 1

Dear Sirs,

In these circumstances afflicting by the death of your King, we want to express our feelings of friendship and to tell you how much your Belgian friends by heart and thoughts are yours.

We formulate for the new Reign our sincerest wishes of Prosperity.

God save the Queen!

G.Gombert

INSTITUTION NOTES

March, 1952

THE ASSOCIATE MEMBERSHIP EXAMINATION AS A GRADUATE QUALIFICATION FOR SALARY PURPOSES

(Teachers in Establishments for Further Education)

THE Council of the Institution is pleased to announce that the Technical Reference Committee of the Burnham Committee has now defined the conditions under which Associate Membership of the Institution can be accepted as a Graduate qualification for salary purposes.

The conditions are that the Associate Member has passed:

(*a*) The Associate Membership Examination not earlier than May, 1951 *or*
an examination accepted after that date by the Institution as giving exemption from the Associate Membership Examination.

(*b*) At Advanced level of the General Certificate of Education in Mathematics or as an equivalent qualification *and*

(*c*) At Ordinary level of the General Certificate of Education in Chemistry or Physics or as an equivalent qualification.

In assessing the incidence of this decision, it should be noted that it applies only to Associate Members or Members who satisfied the academic requirements of membership through the Associate Membership Examination held from May, 1951 onwards. Except that such members may have satisfied the requirements through an examination accepted as giving exemption from the Associate Membership Examination. A list of such exemptions is maintained by the Institution and general exemptions are published in the 'Membership Qualifications and Examination Regulations' booklet.

In addition to the above, recognition of Associate Membership as a Graduate qualification for salary purposes in Establishments for Further Education requires evidence of the standard of general education as defined in paragraphs (*b*) and (*c*) above.

Whilst the Institution will give advice and guidance on this matter, any negotiations for salary purposes must be conducted between the individual and the Authority which he serves.

The Council is confident that, apart from members directly affected by this decision, all members will appreciate the progress which the recognition implies.

NORTH EASTERN SECTION DINNER-DANCE

Mr. R W. Mann (Section President) with the Deputy Lord Mayor of Newcastle (Councillor Parker) at the N. Eastern Section Dinner-Dance held on 12th December, 1951.

NEWS OF MEMBERS

Mr. J. E. Attwood, Member, has been appointed Director and General Manager of Brockworth Engineering Co., Gloucester.

Mr. J. H. Bond, Associate Member, has taken an appointment as General Manager with Chas. Thomas Co. Ltd., Birmingham.

Mr. W. Bone, Associate Member, has taken up an appointment as Assistant Training Officer in the Directorate General of Ordnance Factories (Filling) Headquarters of the Ministry of Supply.

Mr. C. T. Bower, Associate Member, has relinquished his post on the editorial staff of " Machine Shop Magazine " in order to take up free-lance technical journalism.

Mr. R. Carpenter, Associate Member, of Webster & Bennett Ltd., has been promoted to Sales Order Manager with that firm.

Mr. H. J. B. Fisher, Associate Member, has been appointed Engineer II with the Ministry of Supply and posted to the Division of Atomic Energy (P), Risley.

Mr. C. A. Forse, Associate Member, is now Chief Production Engineer, responsible for the Production Engineering and Production Control Departments, at British Oxygen Engineering Ltd., London.

Mr. E. W. Harris, Associate Member, has been appointed Production Inspector with the Armament Supply Department of the Admiralty, London.

Mr. R. H. H. Kingdom, Associate Member, has taken up an appointment as Chief Production Engineer to the Aircraft Division of the De Havilland Aircraft Co. Ltd., Christchurch.

Mr. R. E. Leakey, Member, of E.M.I. Factories Ltd., has been appointed Works Engineer of that Company. Mr. Leakey is a member of the London Section Committee, and a member and past Chairman, of the Technical and Publications Committee.

Mr. G. A. Martin; Associate Member, is now employed as Production Liaison Engineer with E.M.I. Engineering Development Ltd., Hayes.

Mr. C. M. Moatt, Associate Member, has been appointed a Senior Production Inspector for Workshops with the Admiralty Compass Observatory, Slough.

Mr. F. T. Nurrish, M.B.E., Member, has been appointed Joint Managing Director of George Bray & Co. Ltd., and Bray Accessories Ltd.

Mr. A. J. K. Parker, Associate Member, has been appointed Managing Director of F. H. Wheeler & Co. Ltd., London.

Mr. G. R. Parker, Associate Member, has been appointed Chief Production Engineer with Textile Machinery Makers Ltd., Oldham.

Mr. J. R. Pledger, Associate Member, has taken up the appointment of Works Manager with Phillips, Mills & Co. Ltd., Battersea.

Mr. J. R. Ratcliff, B.Sc., Member, has been elected to the Board of K. & L. Steelfounders and Engineers Letchworth.

Mr. M. Seaman, M.Sc., Member, has been appointed to the Board of British Oxygen Engineering Ltd., a subsidiary Company of the British Oxygen Co. Ltd.

Sir Rowland Smith, Member, has been elected a Director of the National Provincial Bank Ltd.

Mr. K. V. Trotter, Associate Member, has joined Transport Equipment (Thornycroft) Ltd., Basingstoke, as Chief Planning and Tooling Engineer.

Mr. J. Wigglesworth, B.Sc., Associate Member, has been appointed Head of the Department of Engineering and Mining at Wakefield Technical College.

Mr. G. Aldridge, Graduate, has been appointed Works Manager of Wyvern Machines Ltd.

Mr. P. J. Berry, Graduate, has taken up a post as Engineer III with the Ministry of Supply, Directorate of Aircraft Production Development.

Mr. G. R. Burn, Graduate, has been promoted to Chief Time Study Engineer at the High Wycombe factory of Hoover Ltd.

Mr. G. C. Jones, Graduate, is now employed in an advisory capacity as Estimator and Designer with Josiah Parkes Ltd., Willenhall.

Mr. L. A. Liddle, Graduate, has taken up the post of Chief Draughtsman with Moulded Components (Jablo) Ltd., Croydon.

Mr. D. McCorquodale, Graduate, is now Assistant Works Manager with Fischer Bearings Co. Ltd., Wolverhampton.

Mr. A. W. Markham, Graduate, is now employed by Serck Tubes Ltd., as Assistant to the Production Manager.

Mr. P. H. Robertson, Graduate, has joined the Birmingham Small Arms Company as a Planning Engineer.

Mr. E. Sullivan, Graduate, has taken up a post as Senior Mechanical Draughtsman with the New Zealand Department of Scientific and Industrial Research, Lower Hutt, N.Z.

Mr. S. R. Westwell, Graduate, now holds the post of Field Service Engineer with the Production Division of the Metal Box Co. Ltd.

BRITISH STANDARDS

The following British Standard has recently been issued and may be obtained post free, price 6/-, from the British Standards Institution, 24-28, Victoria Street, Westminster, London, S.W.1 :—

1780 : 1951 Pressure Gauges.

HAZLETON MEMORIAL LIBRARY

It would be helpful if, in addition to the title, the author's name and the classification number could be quoted when borrowing books.

ABSTRACTS

621.9 **MACHINE TOOLS : MACHINING**

"Increased Production, Reduced Costs through a better understanding of the Machining Process and Control of Materials, Tools, Machines." Machinability Research Program, sponsored by U.S. Air Force. *Curtiss-Wright Corporation, Woodridge, New Jersey.* 1950. 162 *pages. Illustrated. Diagrams.* $2.75.

Recognising the importance of maximum production at minimum cost in mobilisation planning, the U.S. Air Force requested the formation of a Committee to carry out a machinability research programme to meet these requirements. This programme was subsequently carried out under the guidance of Mr. R. T. Harley, President, Curtiss-Wright Corporation. As this work is so new, and the demand for the information so great it was decided to publish the findings, although in some instances they may be almost of a preliminary nature.

The subject is metal-cutting research, i.e. the application of metallurgical analysis to the process of machining. As surprisingly little has

previously been known of the application of metallurgical knowledge for the betterment of machining conditions, this book opens up a new approach to increased productivity.

The chapter headings are self-explanatory, as follows : How to Analyse the Machining Process ; Metals under the Microscope ; Getting the Most out of Machines and Tools ; Machining Jet Engine Alloys ; Cast Iron ; Microstructure and Machinability ; Steel Microstructure Determines Tool Life.

331.1 PERSONNEL MANAGEMENT : EMPLOYER-EMPLOYEE RELATIONS

" Christianity and Human Relations in Industry " by Sir George Schuster. *Epworth Press, London.* 1951. (The Beckly Social Service Lecture, 1950.) 128 *pages.* 6/6.

The work is based on Christ's two commandments, " Love the Lord thy God with all thy heart, soul, and MIND," and " Thy neighbour as thyself." Inseparably, they necessitate limitation of the discourse to applying all the mind to the task of loving " thy neighbour as thyself," and to this it is devoted.

The exposition embraces the three aspects of human relations, the behaviour of " Management " to " Workers," the response of workers, and their relations with each other. The importance of functional efficiency in management is emphasised as well as its attitude, also fulfilling of the commandment as an end in itself, not as a means to that end. The honesty of approach of the lecture to the problems is an example of how that may be done.

Industrial work must be recognised as an essential part of satisfactory life, not an evil burden to be escaped. Influences affecting " workers' " response are discussed at length, and their relation with each other effectively, though briefly. The chapter on the dangers of exploiting religion as a means to material ends, and of wrong interpretation of what science can do is a necessary challenge to contemporary thought and work.

621.89 LUBRICATION

"Lubrication of Steam Turbines." *Shell-Mex and B.P. Ltd., London.* 1951. 129 *pages. Illustrated. Diagrams.*

This book illustrates in detail the many complications encountered in steam turbine lubrication. It makes interesting reading to follow the progress and development of oil to meet the exacting conditions imposed by the use of turbines and the lubrication of the metals from which they are fabricated.

From this introduction, the book covers methods and systems of lubrication, filtering, etc. Turbines and their lubricating systems are illustrated.

658.562 INSPECTION, QUALITY CONTROL

" Inspection, Organisation and Methods " by James E. Thompson. *McGraw-Hill, New York.* 1950. (Industrial Organisation and Management Series.) 369 *pages. Illustrated. Diagrams.* 38/–

This book covers extensively modern inspection methods. Sixteen chapters cover the subject from types of inspection and control of data, organisation and selection of inspection personnel ; control of standards and measuring devices ; inspection of incoming merchandise ; fabrication and assembly ; salvage ; and finally, inspection of shipping or despatch arrangements.

There are many photographs of modern measuring methods and equipment.

OTHER ADDITIONS

331.1 PERSONNEL MANAGEMENT : EMPLOYER-EMPLOYEE RELATIONS

Northcott, C. H. **"Personnel Aspects of Management"—three lectures.** *Lond., Inst. Personnel Management.* 1951. 60 *pages.* (I.P.M. —Occasional papers No. 1.)

Northcott, C. H. **"Personnel Management, Its Scope and Practice."** (2nd Ed.) *Lond., Pitman.* 1950. 336 *pages.*

331.11 SELECTING AND ENGAGING STAFF

Roskill, O. W. & Co. (Reports) Ltd., *London.* **"Methods of Recruitment and Selection of Personnel in Industry and Commerce."** *Lond., the Co.* 1951. 67 *pages typescript.*

331.215 JOB EVALUATION

Johnson, Forrest Hayden, *and others.* **"Job Evaluation, by F. H. Johnson, R. W. Boise, and D. Pratt."** *N.Y., Wiley ; Lond., Chapman and Hall.* 1946. 288 *pages. Diagrams. Charts.*

331.91 ORGANISATION OF LABOUR

Wylie, T. **"A Concise Guide to Industrial Relations ; revised for the Industrial Disputes Order, 1951."** *Birmingham, Industrial Administration Group.* 1951. 35 *pages.*

347.7 COMMERCIAL LAW

Great Britain—*Ministry of Labour and National Service.* **"Factory Orders."** (1951 Ed.) *Lond., H.M.S.O.* 1951. 472 *pages.*

378.996 TECHNICAL EDUCATION

British Engineers' Association, *London.* **"Selection, Training and Education for Technical, Supervisory and Managerial Staffs in the Engineering Industry."** *Lond., The Assoc'n.* 1951. 43 *pages.*

519.2 STATISTICS : THEORY OF PROBABILITY

Ezekiel, Mordecai. **"Methods of Correlation Analysis."** (2nd Ed.) *N.Y., Wiley ; Lond., Chapman & Hall.* 1950. 531 *pages. Diagrams.*

Management Research Groups, *London.* **"Statistics as an Aid to Top Management."**—Report of a Committee for submission to 25th Anniversary Conference of Management Research Groups at Buxton, 1–4 June, 1951. *Lond., Man. Res. Groups.* 1951. 29 *pages.*

Mueller, Robert Kirk. **"Effective Management through Probability Controls : How to Calculate Managerial Risks."** *N.Y., Funk & Wagnalls Co. in association with "Modern Industry Magazine."* 1950 310 *pages. Illustrated. Diagrams.*

608 PATENTS : TRADE MARKS : INVENTIONS

Parsons, Charles S. **"Patents, Designs and Trade Marks."** (With supplement.) *Lond., Technical Press.* 1938–1951. 184 *pages.*

614.8 PREVENTION OF ACCIDENTS : SAFETY MEASURES

Great Britain—*Chief Inspector of Factories.* **"Annual Report—1949."** *Lond., H.M.S.O.*

620.1 STRENGTH OF MATERIALS

Dumond, T. C., *ed.* **"Engineering Materials Manual."** (Collection of articles from *Materials & Methods.*) *N.Y., Materials & Methods; Reinhold Pub. Corp.* 1951. 386 *pages. Illustrated. Diagrams.*

THE LIBRARY Members are asked to note that until further notice the Library will not be open on Wednesday evenings or Saturday mornings, but will be open between 10 a.m. and 5.30 p.m. from Monday to Friday each week.

JOURNAL BINDERS Members are reminded that binding cases for the Journal are obtainable from Head Office, price 7/6 each post free. The cases, each of which will hold 12 issues of the Journal, are made of stiff board covered with imitation leather cloth, with gilt lettering on the spine.

RESEARCH PUBLICATIONS A number of copies of the following Research publications are still available to members, at the prices stated :

Report on Surface Finish, by Dr. G. Schlesinger	15/6
Machine Tool Research & Development	10/6
Practical Drilling Tests	21/-
Test Charts for Machine Tools, Parts 3 and 4	5/6 each

These publications may be obtained from the Production Engineering Research Association, "Staveley Lodge", Melton Mowbray, Leics.

ISSUE OF JOURNAL Owing to the fact that output has to be adjusted to meet requirements, and in order to avoid carrying heavy stocks, it has been decided that the Journal will only be issued to new Members from the date they join the Institution.

IMPORTANT In order that the Journal may be despatched on time, it is essential that copy should reach the Head Office of the Institution not later than 40 days prior to the date of issue, which is the first of each month.

GRADUATE ACTIVITIES

1952 GRADUATE REPRESENTATIVES' CONFERENCE
Final Notice

The 1952 Graduate Representatives' Conference will be held on March 29th at Birmingham.

In addition to approximately 50 delegates from all parts of the country, Mr. H. Burke (Chairman of the Special Committee on Organisation) and Mr. W. F. S. Woodford (Institution Secretary) will attend as Conference guests. The Conference Secretary will be Mr. Warren Silverbach, 44, Linwood Road, Handsworth, Birmingham, 21.

HALIFAX The Halifax Graduate Section is going ahead with the organisation of a Week-End School this summer, and any members or Sections who are interested are asked to contact the Section Secretary.

LONDON The London Graduate Section is pleased to note that for his paper " Industrial Law and the Production Engineer," Mr. H. P. Jost has been awarded the London Section President's Prize (for the best paper presented to the Section by a Graduate during the year 1950-51), and the Institution Medal for the Best Paper presented by a member during 1950-51, the latter award being shared with Mr. P. K. Eisner, of Manchester Graduate Section. Mr. Jost's paper has also been recommended, jointly with Mr. Eisner's paper, for the Hutchinson Memorial Medal, 1951.

Mr. Jost is now an Associate Member and a member of the Technical and Publications Committee. He is a member of the London Graduate Section Committee and has been very active in the Section for a number of years.

This is the third time during the last five years that Institution Medals have been awarded to Graduate Members. It is clear that although a Graduate cannot have the knowledge and experience of a senior member, with sufficient care and preparation he can write a paper that will compare favourably with any papers presented to Sections. Perhaps if this was more fully realised by Graduates, there might be a better response to appeals for papers from Graduate members.

MANCHESTER The Manchester Graduate Section is pleased to record that Mr. P. K. Eisner, who is at present Visits Secretary and a member of the Graduate Section Committee, has been awarded the Institution Medal 1950/51 jointly with Mr. H. P. Jost of the London Section.

THE FIRST
SIR ALFRED HERBERT
PAPER, 1951/52

Sir Alfred Herbert, K.B.E.

As members are now aware, the First Sir Alfred Herbert Paper will be presented by Mr. F. H. Rolt, O.B.E., on the 19th of this month. The following biography of Mr. Rolt, together with a brief synopsis of his paper, will be of interest.

MR. F. H. Rolt received his early education at the Rutlish Science School, Merton, whence he gained a Surrey County Council Major Scholarship to the City and Guilds Engineering College, South Kensington. He was awarded the Diploma of that College in Civil and Mechanical Engineering in 1908 and took his B.Sc. degree in 1913. He received his practical training with the P. & O. Steam Navigation Co., Messrs. Caird of Greenock, and The Fairfield Shipbuilding & Engineering Co., Glasgow. He joined the scientific staff of the National Physical Laboratory in 1912, and with the exception of a period during the last war when he was seconded to the Ministry of Supply, he has been engaged in the Metrology Division since that date.

Mr. F. H. Rolt, O.B.E.

He succeeded Mr. J. E. Sears as Superintendent of the Division in 1946. Prior to his taking charge of the Metrology Division, which is concerned with accurate measurements in the wide sphere of Mass, Length and Time, Mr. Rolt devoted himself to the section of the Division which deals with engineering standards, the measurement of gauges and the development of measuring instruments. He published two volumes of a book on" Gauges and Fine Measurements " in 1929.

During the last war he was transferred to the Machine Tool Control, where he held the post of Director of Gauge and

Measuring Instruments and was responsible for the supply of that type of inspection equipment on a national basis.

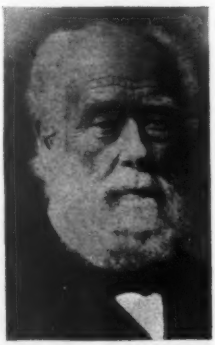
Mr. Rolt's work has brought him into close contact with that of the British Standards Institution in the field of Production Engineering. He has been for many years a member of the Committees on screw threads, limits and fits, surface finish, drawing office practice, engineers' measuring instruments and gauges. In the international field, he has participated in various Anglo-American Conferences in London and Ottawa on engineering standards, including the Unified Screw Thread, and has been a member of the British delegations to a number of Conferences held by the International Standards Organisation in various countries since the war.

Mr. Rolt has taken an active interest in education in the field of engineering metrology. He has given many lectures on that subject both in this country and abroad, and was instrumental in introducing it into the syllabuses for the Higher National Certificates for Mechanical and Production Engineers. He is a member of the Regional Advisory Council for Higher Technological Education, and is chairman of the Apprentices Advisory Committee at the N.P.L.

Mr. Rolt was elected a Member of the Institution of Production Engineers in 1947. He represents the D.S.I.R. on the Technical Committee of P.E.R.A.

THE DEVELOPMENT OF ENGINEERING METROLOGY

(*SYNOPSIS*)



Sir Joseph Whitworth

In his paper, Mr. Rolt reviews the progress made in the art of precise engineering measurements during the last half-century or so. After referring to the pioneer work of Sir Joseph Whitworth during the latter half of last century, he traces the main stages of development through the introduction of slip gauges by C. E. Johansson about 1900 ; the work carried out by Mr. E. M. Eden and others at the N.P.L. during the First World War in the improvement of engineers' standards of length and equipment for measuring screw gauges, including the innovation of gauge projectors ; the introduction of the Zeiss comprehensive range of optical

measuring equipment during the inter-war period ; the work of Mon. F. Turrettini of La Société Genevoise in the design of measuring instruments and machines incorporating precision scales ; and the outcome of the growth and achievements of the British gauge and measuring instrument industry, particularly during and subsequent to the last war, in which the late Sir Harry Harley played a leading part.

The account embraces the progress made in the application of mechanical, optical, electrical and pneumatic devices for measurement, and includes the development of the technique of surface finish measurement.

The paper concludes with a review of present trends of development including the " mechanisation " of measurements by the increased use of auto-graphic methods, the "tooling-up" of gauging operations by the more extensive use of automatic gauging machines, and the increased provision of measuring devices in the design of machine tools.

A small exhibition of historical interest will be on view in the meeting-hall between 6 and 7 p.m. and after the meeting. Admission to both the exhibition and the lecture will be by ticket only.

(*Top right*)
Mr. C. E. Johansson

(*Centre*)
Mr. E. M. Eden

(*Bottom right*)
Sir Harry Harley, C.B.E.

(*Left*)
Mon. F. Turrettini

PROCEEDINGS OF
THE ANNUAL GENERAL MEETING
23rd January, 1952

THE Annual General Meeting of the Institution was held on Wednesday, 23rd January, 1952, at 7 p.m., at the Institution's Headquarters, 36, Portman Square, London, W.1. Mr. Walter C. Puckey, Chairman of Council, presided, in the absence abroad of the President.

ANNUAL REPORT

In proposing the adoption of the Annual Report, the Chairman said that he hoped the Meeting would take the Report as read, as it had been published in the January issue of the Journal. He wished, however, to draw attention to some of the more important items.

EDUCATION The Chairman understood that there were still ten students taking the Higher National Certificate in Mechanical Engineering for every one who took the H.N.C. in Production Engineering. Those who were concerned for the future of this country, and who knew what was really needed to improve its position in the near future, would realise that this proportion of Production Engineering students was much too low. He hoped industrialists would ensure that their apprentices were encouraged to take the production courses.

THE JOURNAL Council were fully conscious of the desirability of publishing still more professional matter, and possibly reducing the number of advertising pages.

HAZELTON MEMORIAL LIBRARY Many members still recalled with gratitude Richard Hazleton's work for the Institution. Council were grateful to the Graduates for the amount of time which they gave to the work of the Library Committee, the demands on whom were steadily increasing.

STANDARDISATION The Standards Committee, under their new Chairman, were continuing and even increasing their activity, and had a great deal of work in front of them.

RESEARCH Between two and three thousand copies of the Report on "Measurement of Productivity—Applications and Limitations" had already been sold outside the members of the Institution.

The Chairman referred to the question of a full-time Technical Officer, which had been discussed at several Council Meetings. Although the need for such an appointment was very apparent, the appointment would not be made until the financial position was secure.

LOCAL SECTION ACTIVITIES

Every effort had been made to encourage Local Sections to increase their activities and to report to Council for publication in the Journal.

SPECIAL COMMITTEE ON ORGANISATION

Some members, said the Chairman, had questioned him as to the reason for setting up this Committee, which had been largely due to the initiative of the President. His answer was that any growing business ought to be in advance of itself, and the more successful it was the more it should look towards the future. To do so was a sign of strength.

Mr. Burke, Vice-Chairman of Council, had done an outstandingly good job. The Report of his Committee had already been considered very fully at the last Meeting of Council, and almost every Section Committee and every Standing Committee had already discussed it. It would be fully discussed again at the next two Council Meetings. It would be premature to forecast what the outcome would be, continued the Chairman, but he thought that, in future years, the setting up of the Committee would be regarded as a milestone in the Institution's progress.

MEETINGS OF COUNCIL

By " streamlining " the routine business of the Council, it had been possible to devote a part of each Council Meeting to the discussion of Institution affairs and general policy. If this practice was continued, Council would be able to spend more time on the constructive side of the Institution's work than had been possible in the past.

In reply to a question from Mr. T. FRASER, the Chairman said that all arrangements in connection with the Institution Papers were being made in accordance with the wishes of Lord Nuffield and Sir Alfred Herbert.

The Chairman then put the motion for the adoption of the Annual Report, which was carried.

STATEMENT OF INCOME AND EXPENDITURE, BALANCE SHEET AND AUDITORS' REPORT

On the motion of Dr. H. SCHOFIELD, seconded by Mr. H. TOMLINSON, the Statement of Income and Expenditure, Balance Sheet and Auditors' Report, which had been published in the January, 1952, Journal, were adopted.

ELECTION OF AUDITORS

On the motion of Mr. J. D. SCAIFE, seconded by Mr. H. P. JOST, Messrs. Gibson, Appleby & Co., Chartered Accountants, of Aldwych House, London, W.C.2., were re-elected Auditors to the Institution for the year 1951-52, and were thanked for their services.

ELECTION OF SOLICITORS

On the motion of Mr. T. FRASER, seconded by Mr. M. SEAMAN, Messrs. Syrett & Sons, Solicitors, of John Street, Bedford Row, London, W.C.1., were re-elected Solicitors to the Institution for the year 1951-52, and were thanked for their services.

VOTE OF THANKS

Mr. F. C. WHITE proposed a vote of thanks to the President, Major-General K. C. Appleyard, to the Chairman of Council, Mr. Walter Puckey, and to the Vice-Chairman of Council, Mr. Harold Burke, for the work which they had done for the Institution during the last two years. General Appleyard, he said, had been a particularly active President who had guided the Institution in a brilliant manner. He had done a first-class job.

With regard to Mr. Puckey, he had been selected, during his term of office, to play a principal part in the rearmament programme. A job of that magnitude made great demands on a man's time, but, so far as the Institution was concerned, Mr. Puckey's constant attendance at meetings and his attention to Institution affairs had been undiminished since he had undertaken the Government appointment.

Finally, as one of his associates in Birmingham, Mr. White would say that Mr. Burke had done his work in the way the Institution expected of him. He could think of no higher praise.

The vote of thanks was carried by acclamation.

In thanking Mr. White, the Chairman said he knew of no better voluntary activity to undertake than work for the Institution. Since he had been engaged in his new appointment, he had seen even more clearly than before, the great need for a strong Institution of Production Engineers. If all the members would see that and work for it, the Institution would realise its objectives more quickly.

He would like to express appreciation, on behalf of all members, of the work done by the permanent staff of the Institution. He worked very closely with them, and could assure members that the Institution was well served.

The Secretary expressed thanks for his colleagues and himself.

The proceedings then terminated.

REPORT OF
THE MEETING OF COUNCIL
24th January, 1952

THE Third Meeting of Council in the 1951-52 Session was held at 36, Portman Square, London, W.1, on Thursday, 24th January, 1952. Mr. Walter C. Puckey, Chairman of Council, presided over an attendance of 30 members. Also present were Mr. T. E. Hines, Chairman of the Liverpool Graduate Section, and Mr. J. D. Robinson, Chairman of the N.Eastern Graduate Section.

ELECTION OF PAST PRESIDENTS AND VICE-PRESIDENTS The following were elected to serve on Council for the year 1952-53 :—

Past Presidents:
Major-General K. C. Appleyard, C.B.E.
The Rt. Hon. Viscount Nuffield, G.B.E.
Mr. J. D. Scaife.
Dr. H. Schofield, C.B.E.

Vice-Presidents:
Mr. J. Blackshaw, M.B.E.
Mr. T. Fraser, C.B.E.
Mr. J. E. Hill.
Mr. Walter C. Puckey.

PRESIDENT-ELECT, 1952 Council agreed unanimously that Sir Cecil Weir be elected President-Elect, to succeed Major-General K. C. Appleyard as President on 1st July, 1952.

FINANCE Council devoted a considerable time to discussion on the Institution's finances. Mr. A. L. Stuchbery drew members' attention to the fact that the value of the Institution's assets and accumulative funds had diminished since the War, and urged that the utmost attention should be paid to central expenditure to ensure that not only was solvency maintained, but that the accumulative funds should be increased.

The Secretary reminded Council that the decline in the net worth of the Institution was mainly due to delay in increasing the rates of annual subscriptions, which had resulted in the very large deficit of 1948. In each subsequent year, when the subscription rate was increased, there had been a surplus of income over expenditure, and a surplus was also budgeted for in the current year. This would enable Council to transfer the sum of £2,000 to the New Building Fund, which had been done in the present year.

The Chairman said that the Institution had every reason for confidence in the future. The Finance Committee carefully scrutinised all expenditure, and were satisfied that it was necessary.

He took the positive view that, in order to maintain and expand Institution services, they should concentrate their forces on increasing the Institution's income by attracting to its membership more senior executives from all manufacturing industries.

INSTITUTION MEDALS, 1950/51 On the motion of Mr. A. L. Stuchbery, seconded by Mr. R. Kirchner, the following recommendations for the award of Institution Medals were adopted :—

Non-Member: Mr. J. Redshaw for his paper entitled " Building an Ocean Liner."

Member: Jointly to Mr. P. K. Eisner, Grad.I.Prod.E., for his paper on " Tracer Controlled Machine Tools " and Mr. H. P. Jost, Grad.I.Prod.E., for his paper on " Industrial Law and the Production Engineer."

MACHINE TOOL ADVISORY PANELS Mr. S. W. Rawson, Director-General of Machine Tools, Ministry of Supply, attended the Council Meeting and gave the members a resumé of the important work which was being done through the various Utilisation Technical Advisory Panels. His address is reported in full on pages 141-147.

In the discussion which followed, members took advantage of the opportunity offered to take up many points with Mr. Rawson, who dealt fully with questions raised.

The Chairman, on behalf of Council, thanked Mr. Rawson warmly for attending the Meeting.

ASSOCIATE MEMBERSHIP On the motion of Mr. J. France, seconded by Mr. E. Percy Edwards, Council adopted a number of recommendations by the Education Committee so that the framework of the examination regulations could be adjusted to enable the Council to pursue a broader policy.

EDUCATION Council decided that the Institution should award, each year, a prize to the value of £5 5s. to a student showing outstanding merit in the examination for the Higher National Certificate in Production Engineering.

REGIONAL PRODUCTIVITY EXHIBITION The information unit of the Treasury had organised a Touring Productivity Display, and the Institution had agreed to co-operate by examining the proposals for the display.

SECTION DEVELOPMENT Council approved the granting of full Section status to the Shrewsbury Sub-Section, and the formation of a Sub-Section at Norwich. Council also approved the formation of a Sheffield Graduate Section.

JOURNAL The Technical and Publications Committee reported that adjustments had been made in the printing costs and advertising charges to keep pace with current costs.

COMMON SUBJECT Council adopted the Technical and Publication Committee's recommendation that instead of choosing a specific title as a Common Subject for discussion throughout the Sections, it would be better to suggest a general theme, which could be adapted by Sections to suit particular interests and industries in the area. For the 1952-53 Session, the suggestion was approved that " methods of achieving more economical production " should be discussed.

INSTITUTION DINNER, 1952 Arrangements had been made to hold the next Institution Dinner at the Dorchester Hotel on the 9th October, 1952. The name of the Guest of Honour would be announced later.

RESEARCH The edited Report on Time Study Training was now being considered by the Joint Committee prior to publication.

Following the issue of the A.A.C.P. Report on " Production Control," the Joint Committee intend to make some researches into this particular problem. The Committee also intend to deal with the question of Direct and Indirect Functions of Works Statistics, and preliminary data on this subject is being assembled.

MATERIALS HANDLING The Materials Handling Sub-Committee, under the Chairmanship of Mr. T. W. Elkington, has made considerable progress with its arrangements in connection with the One-Day Conference to be held in June, 1952, and has also started work on its First Memorandum. In connection with the latter, a survey of materials handling practice had been arranged, and a questionnaire was to be circulated to approximately 1,000 firms. It was hoped that some analysis of the replies received would be available, in published form, at the Mechanical Handling Exhibition.

STANDARDISATION An enthusiastic response had been received from affiliated firms approached by the Committee on the lines laid out in the last Report to Council. Already several firms had made a number of useful suggestions, which had been approved by the Committee and forwarded to the British Standards Institution for investigation. It was especially interesting to note that overseas firms, in addition to those in the U.K., were prepared to support this campaign.

HAZLETON MEMORIAL LIBRARY The Library Committee were pleased to report that a larger number of members were making demands on the Library and many had expressed their appreciation of the Library service. The Committee would also like to record their sincere appreciation of help received from members all over the country in the valuable service of abstracting.

ELECTION OF MEMBERS The list of elections and transfers approved by Council appears on pages 166/171.

LOCAL SECTION REPORTS Quarterly Reports presented to Council appear on pages 172/184.

SECTION MEETING TICKETS There was considerable discussion on the question of resuming the practice of issuing members' tickets for Section Meetings. Eighteen Sections had reported on their experience so far, and, of these, eleven reported a satisfactory position, with increased attendances in most cases ; seven Sections showed a decrease in the number of members. In every case an increase in the number of visitors present was reported.

On the motion of Mr. J. E. Burnett, seconded by Mr. Kirchner, it was agreed that Sections be allowed to have tickets if they so desired, or to adopt any other form of notification within the cost of the normal ticket procedure, for the remainder of the present Session.

HONOURS Council were glad to learn that a number of members (whose names appeared in the February Journal) had been honoured by H.M. The King in the New Year List.

OBITUARY The Chairman reported with deep regret the deaths of the following members : J. A. T. Crump, A.M.I.Prod.E. ; T. N. Francis, Stud.I.Prod.E. ; C. R. M. Frost, A.M.I.Prod.E. ; W. Goodwin, A.M.I.Prod.E. ; A. H. Gledhill, M.I.Prod.E. ; J. Jones, A.M.I.Prod.E. ; W. T. Jones, M.I.Prod.E. ; A. E. Kitson, A.M.I.Prod.E. ; J. F. MacLaren, M.I.Prod.E. ; G. H. Rogers, M.I.Prod.E. ; W. G. Thorpe, M.I.Prod.E. ; D. Whiteley, Grad.I.Prod.E.

The Chairman referred especially to Mr. W. T. Jones, who was Managing Director of the Talbot Bakery Company and former Chief Engineer at the Byass Tinplate Works, Aberavon. He was one of the three members responsible for the formation of the West Wales Sub-Section ; was its first Chairman, and remained a Committee member until his death.

DATE OF NEXT MEETING

Wednesday and Thursday, 23rd and 24th April, 1952, at 36, Portman Square, London, W.1. It was agreed to deal with the routine business of Council on the Wednesday evening, leaving Thursday free for full discussion on the Report of the Special Committee on Organisation.

ADDRESS TO COUNCIL

by Mr. S. W. RAWSON,

Director-General of Machine Tools, Ministry of Supply.

24th January, 1952

I AM very glad to have the opportunity to come to the Institution of Production Engineers and to say "Thank you" to your members for the way in which they have tackled this job and carried out the very onerous and difficult duties which have fallen on many of them.

The original conception of these Utilisation Panels arose from consideration which was given at a very early stage to what the machine tool equipment of the Defence Programme was going to be. I think that most of you know that there are in the Defence Programme about 36,000 new tools. At the time when it was decided that that was the approximate number—it could only be very approximate to begin with—likely to be required, a great deal of consideration was given to the exact way in which those tools should be acquired. It was a very difficult decision to make. The people who made it had in front of them alternatives each of which was bound to lead them, if anything went at all wrong, into the most serious difficulties.

MAKING THE DECISION

At the time when the Defence Programme was initiated, the choice was either to get the whole of what was required, with very few and necessary exceptions, out of the British machine tool industry, or to permit the British machine tool industry to go on as it was, gradually increasing the load on it and the proportion of the load on it for Defence, and not interfering in any way with other industries which were making most important contributions to export.

The alternative of placing the whole of the Defence Programme on the British industry would have meant that roughly 80 per cent. of the printing machinery industry would have been occupied with machine tool manufacture, together with perhaps half the fine textile machinery manufacturers, and a good proportion of the Diesel engine makers, who would have had compulsorily to give up their heavy export trade, won in very hard markets, and to turn their energies to Defence. That is very proper when the country is in a state of siege and the enemy is at the door, but hardly practicable when the nation is trying to struggle back to an overseas income which would meet its overseas obligations, and when everything which people have been urged to do and have done over the last five years might have to be thrown into the discard overnight.

At that time the overseas income of this country was showing an extraordinary degree of improvement, and therefore the decision was taken that as high a degree as possible of the machine tool equipment of the Defence Programme should be obtained by world purchase. Originally over 9,000 machines were ordered from the U.S.A. At the present time the demand on the U.S.A. is of the order of 6,000 machines. That reduction was brought about by the fact that within some four or five months of the decision to which I have referred being taken, the U.S.A. woke up to the fact that the United States needed a Defence Programme as well. It may perhaps be appropriate to remind you that as late as March, 1951, one of the leading military authorities of the U.S.A. asserted that not a single additional machine tool would be needed by the U.S.A. to man a complete Defence Programme on a war footing. That was said in an official speech on 31st March, 1951. By June of 1951 consideration was being given to doubling, and possibly trebling, the machine tool capacity of the U.S.A. in order to meet the Defence Programme.

FACING THE FACTS

That sounds rather absurd in a way, but it is one of the extraordinary facts about the way in which the Defence Programme was regarded by people who were quite competent authorities in their particular field, but who neglected to realise that the purpose of a Defence Programme here and in the U.S.A. was founded on the fact that it is only by providing weapons of a high degree of technical superiority that we can have any hope whatever of ensuring ourselves against having to use them.

The U.S.A. starts from one major premise, that it can never be beaten in war because of its immense productive power. That is probably true in the long run, but it might be a very long run, and the degree of technical superiority which we have over our potential enemies is rather less high than it was thought to be eighteen months ago. None the less, the reason why we have to go in for a large programme of large machine tools and accurate machine tools is the engineering demand which is made by the type of weapon which we have to produce.

I do not think that I am giving away any secrets when I say that a modern type of aircraft requires six to twelve times the machining hours required by the most modern type which existed at the end of the last war, and the limits which have to be observed in a great many of the pieces of ammunition and equipment, of aircraft and aircraft engines, are far more severe than they were in 1941-43. I have tried to sum it up by saying that the 1914-18 war was fought in 64ths, the last war in 1½ thous., and the next war, if it occurs, will be fought in 1½ ten-thous. That is a fair representation of the sort of problem which we are up against.

At present there are 6,000 machine tools coming from the United States and 12,000 from the continent of Europe. The balance of 18,000 has to come out of Great Britain. A review of the machine tool industry, as it was in the middle of 1951, showed that there would have to be diverted from their original purpose on the then order books of the British machine tool industry something like one machine in four.

In the case of some types of machine, the diversion factor looked like being 100 per cent., because there were not enough machines of that type produced in the world to meet the joint demands of this country and of the U.S.A. In the case of the big turret lathe, for example, the visible supplies in the U.S.A. and in Great Britain are something like 20 to 25 per cent. below the demand, as it is seen to-day, of the aircraft industry of the U.S.A., and of the aircraft industry of Great Britain, and of rather less than half the land programme of the U.S.A. In the case of certain other machines of a more special type the demand is hopelessly in excess of the supply. There are, of course, various reasons for that. Everybody wants to have the machine which is the best possible for its purpose, but these rare machines have to be diverted and used only for the critical purposes ; for the others we have to find alternatives.

THE PROBLEM OF DIVERSION

The first problem which we had to face was the problem of diversion. Obviously anybody who has ordered a machine tool, and who has probably waited for it for fifteen or even twenty-four months, is not going to be particularly pleased if he is still not going to get it, because by every man his own business is regarded as by far the most important. We knew that a great deal of criticism and a great deal of heart-burning and a great deal of genuine grievance were bound to be created if we had to take tools away arbitrarily from their original purchasers. In order to find out exactly how deep and how real was the need for them, the position had to be looked at by people for whose opinion the aggrieved man would at least have some respect, even if he did not accept their judgment as decisive.

As you know, the worst thing that we can possibly do in a country such as this is to create big-scale organisations which can only work roughly at an efficiency of something under 5 per cent. We had the choice of either getting a very large number of people to act as advisers in the matter or of employing a large number of people to act temporarily in that way. If you adopt the second alternative and have permanent employees you are liable to get a large supply of the people who cannot hold a place in industry, and that is why they are free to come to you. We decided, therefore, that it would be better to take the other course.

We knew that there existed in Great Britain a large number of people who would be suitable. They are very busy men, but it is usually the busy man who has more time for another job. As a result of basing our geographical distribution on the areas covered by the Machine Tool Trades Association, we got together a team which is now 219 strong. At the present time there are six areas, and two others which will be constituted as areas by themselves in a very short time, one at Bristol and one to take care of South Wales in particular. Of those 219 people, 136 are members—either Associate Members or full Members—of the Institution of Production Engineers. That is a very notable percentage, 62 per cent. ; it can be said that two-thirds of them are members of this Institution.

REACTION TO DIVERSION POLICY

They have already dealt with over 376 applications for diversion of machine tools, which have been dealt with by Panels built up from that membership in their particular areas. In addition to the cases which have been dealt with by the Panels, there have been over 100 machine tools diverted away from their original purpose by the consent, without any examination, of the people for whom they were originally destined. I think that it speaks very well indeed for the forbearance and public spirit of the people concerned and for the work of the Utilisation Panels that so far, with all these diversions, we have not had a single appeal from the judgment arrived at on the basis of the Panel reports.

We cannot expect that that will always continue, because the more frequent such diversions become, the more intense the degree of diversion as time goes on, the more people will believe that they may have to wait too long for replacements, and they may find that they are overworking their existing machines, so that they may have a very good cause for complaint and a very good reason for saying " My need is greater than the Defence Department's need." That objection would be thoroughly justified if any diversion took place arbitrarily, and a machine was sent to the Defence Programme which was not at once put into full operation. That side of the diversion policy has to be most carefully watched, because the need for the machine for Defence has equally to be abundantly justified before it can be diverted.

It is only fair that where you have to deprive a man of a machine and give it to somebody else, the onus of proof should lie on the man who receives it as well as on the man who is asked to give it up. As Defence Programmes get nearer and nearer to their complete manning of machine tools, that is a problem which may become of even greater importance. It is not at all proposed that the receiver of machines should be free from the visit of the Panels,

any more than that the giver of the machine should be free from that visit. It is for the would-be receivers to prove their need, just as it is for the man who originally ordered the machine to prove his overriding need.

That is the function of the Diversion Panels, which so far has been applied in a very serious fashion and which has already had some very profound effects. A number of you and a number of your colleagues have carried out quite intensive examinations of the demands made by ordnance factories, by aircraft factories, by aero-engine makers and so on, and for certain types of American machines built by Cincinnati, the Hydromatic and the Hydrotel, I had with me in Washington copies of these reports of investigations which had been carried out in a way which was exhaustive. It was my duty to hand over these reports, and to show people in the United States exactly how we were screening the demands which were made on us by our own Defence Department for these particular tools.

We had it thrown at us in the U.S.A. that we were asking for far too much. You must not forget that between April and June of last year what had been dollar purchases by this country in the U.S.A. became military aid from the United States to this country. This country has obtained in military aid from the United States about £50,000,000 worth of machine tools. The price of each machine tool is high, but what is tantamount to a gift of that magnitude is not by any means to be looked on as justifying extravagance on our part. The money has to come from the American taxpayer, and the American officials were fully entitled to demand of us that we should not ask them for one machine tool more than we needed, and that we should cut to the limit our demand for critical tools of which the supply is hopelessly behind the possible usage.

AMERICAN APPRECIATION

With those reports in my hand I was able to justify all the demands as set out by the Panels, and, in the case of some hundreds of machines, to obtain promises of much earlier delivery than we had any right to expect. Even within those demands, there have been pushed out of their order of delivery a considerable number of tools destined for the American programme, but which have been sent to us over here. Without the signature to those reports of men who were regarded as competent in their judgment, experience and knowledge, that would have been a quite impossible position. The fact that our Utilisation Panels exercise their independent judgment and give a disinterested opinion as to the need for the machine, as to the circumstances surrounding the demand for it, and as to what

it is going to be used for, carried a weight which was really surprisingly satisfactory. I say " surprisingly " because there are many suspicions in the U.S.A. of the motives of the Britisher, but the moment that those reports were in their hands—clear, factual, without any frills on them—showing the real state of affairs and what was required to be done by the machines, they were regarded as being satisfactory, and the only comment which I heard on them was that the Americans sincerely wished that they could get the same type of thing out of their own industry.

It is due to the professional spirit which is imbued in Institutions like yours that Englishmen can give a disinterested opinion when asked to do so. They are not swayed by any outside considerations, and if they undertake to do a job they do it in a disinterested and public-spirited way. I am certain that that is the reason why those reports are accepted in the frank and sincere way that they have been.

That particular function of the Utilisation Panels came at a very critical time, because there has been in the United States a control of their machine tool industry ; 70 per cent. of what is produced in the U.S.A. is reserved for their own Defence Programme, and 30 per cent. is left to meet civilian demand in the U.S.A., military aid to the North Atlantic countries, and whatever exports they look upon as essential. When the output of tools is limited, that 30 per cent. means quite a small number of machines.

In the case of one type of machine which has become very fashionable and urgently required, 30 per cent. of the output of that machine means 1½ machines a month, while the demand for that machine in this country alone is between 4 and 5 machines a month for the next eighteen months, and the United States demand for that machine is 25 a month for the next three years. The only way, therefore, in which we can get more than a very exiguous supply is by being able to draw on the home defence proportion of the United States, and we can do so only by having an overwhelmingly strong case, properly vouched for by independent investigators. That is the most powerful weapon which we have. It has proved its worth, and we hope that we shall be able to continue to use it in exactly the same way.

VALUE OF CO-OPERATION

It may very well be that in the course of the difficulties which we are getting into with our European payments, we may have to swing a bigger burden of the load of rearmament over the next eighteen months on to this country. The British machine tool industry is taking this year a much bigger proportion of the load than it took last year, because of the orders placed on it a year or fifteen months ago, but it is not at all unlikely that we may have to go in for far

more diversion than we did last year. It will be a very difficult job, but I am certain that, if it is carried out in the same way, with any individual man from whom a machine is taken having the opportunity to discuss the matter fully with disinterested people who talk the same language as he does, we shall get by with the minimum of friction ; there is bound to be some, but it can be reduced to a minimum.

I should like you to consider the position of the Ministry of Supply in the House of Commons, when a Member of Parliament for a particular division gets up andsays; " Is it true that Messrs. So-and-So have been deprived of very badly-needed machines for their export business ? " The Minister is able to reply; " A Panel of informed people, competent to judge the situation, have examined this case fully and have reported on the facts, and on their report this decision had to be made, however regrettable it may be in this particular case." In Parliament, that is the most powerful position that a Minister can be in.

INCREASED PRODUCTIVITY BY WORKSHOP PRACTICE

by A. CAMERON, A.M.I.Prod.E.*

Presented to the N. Eastern Section of the Institution, 15th October, 1951

IN giving this paper, I propose firstly to deal with the necessity to organise for productivity.

During the last few years, much has been achieved by this and similar organisations, in educating the technical personnel of our profession to new practices and methods for achieving increased productivity. The practical results of this education have often been very gratifying and praiseworthy, but I am of the opinion that much has been lost by the failure to recognise the necessity to train fully the actual personnel whose daily efforts are responsible for the increased output per man-hour which this nation so badly needs. Surely we are all agreed that the final results of all our efforts for increased productivity lie in the hands of the producers themselves ; without their willing and intelligent co-operation, we cannot hope to succeed.

MAKING FULL USE OF MACHINE TOOLS

There are many sources of increased productivity which often lie untapped in the machine tools in a factory. I wonder how many of those here tonight would have the courage to assert that the operators on the machines in our factories are using to the full the devices for increased productivity which the machine tool designer has, after years of research and experience, built into these machines. I, for one, would hesitate to make such an assertion, as I have all too often seen in our own factory really well-designed machine tools being operated with a complete disregard for the refinements provided by the designers.

In my experience, this situation is usually worse on the machines which deal with small batches, and are more often than not operated by skilled men.

To illustrate this point, let me turn to a machine very often used for small batches, the centre lathe. Most modern lathes are provided with quick methods of changing feeds, speeds and screw-cutting pitches. The operator is compelled to use these devices, but there are other aids to production provided which can be, and indeed often are, ignored.

* *Works Director, Victor Products (Wallsend) Ltd.*

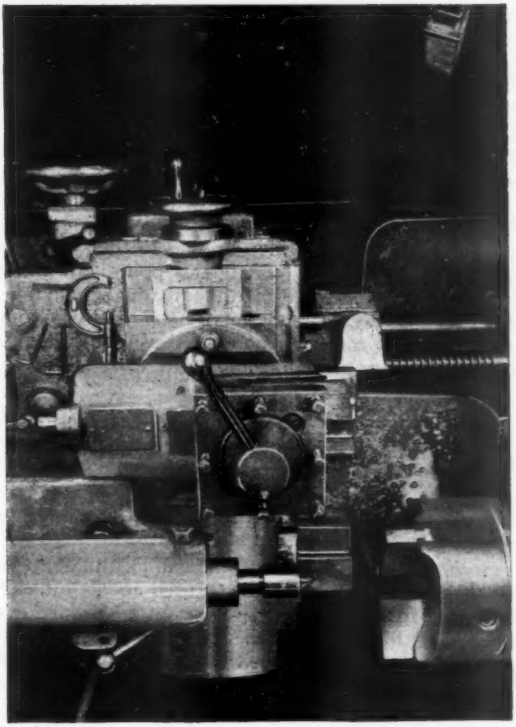


FIG. 1

I make no apology for showing Fig. 1, which illustrates the saddle of an ordinary lathe. Most of us have been familiar with this very straightforward part of a machine tool since we first entered a machine shop. For at least the last fifteen years the design has been on the lines shown in this figure.

Note the turret type tool holder, which is designed to permit four different types of tools to be held at once. How often one sees cutting tools being taken in and out of these tool holders quite unnecessarily, and with a consequent loss of productivity. In addition, how often are the micrometer dials provided in the tool rest slide and the cross slide spindle used for the purpose for which they were designed? More often than not these dials are used to

adjust the cutting tool for the last few thousandths after innumerable measurements with a micrometer, no attempt being made to record the readings so that the sizes on the next component in a batch can be obtained quickly. Indeed, the accuracy of these dials is often rendered completely useless by the operator failing to set the cutting tool at the correct height.

A good pointer to this state of affairs lies with the cross slide dial. Some manufacturers graduate this dial to show thousandths of an inch of reduction in diameter, whilst others graduate to give " thous " of stock removal. It can be very illuminating to ask operators which type of graduation applies to their machine.

You may think I am over-stressing this point, but I can assure you that I have had the greatest difficulty in persuading skilled turners to set up a centre lathe for small batches of components.

The centre lathe has merely been quoted as an example, and the same remarks can be applied to almost any class of machine used for small batches.

WHO IS RESPONSIBLE?

Let me say, here and now, that I do not wish to cast any slur upon the skill of the artisan either in this district or any other district in Britain. The quality of British produced goods has long been world famous, and there is no doubt that the skill of our artisans has contributed a great deal to this situation.

Furthermore, I feel that we are indeed fortunate to have, as operatives, personnel who have been raised in an industrial and mechanical age. In this respect we have an advantage over most other nations, and I am convinced that these descendants of men whose skill with hand tools was without equal, can be trained to equal skill and enthusiasm in the use of the modern equipment now installed in our factories.

I feel that the blame lies at our own doorstep, we, the Managements and Production Engineers who have failed to train these men in the proper use of modern machine tools. Indeed, in the past, we very often failed to provide the necessary incentives for these men to improve their productivity when using the expensive machine tools which were installed.

Many companies have excellent systems for training apprentices and junior personnel entering the works, but I find little evidence of any determined effort to improve the knowledge of the older operatives.

ORGANISING A METHODS TEAM

This brings me to the point of the necessity for organising a Methods Team whose *only* function is to improve productivity.

In my opinion, it is most important that this section should be completely divorced from the normal factory floor administration,

as the people employed in the administration are dealing with the day-to-day problems in the factory and cannot be expected to have the time to train personnel, to study and introduce new methods.

This Methods Team should consist of equal numbers of technical Production Engineers and practical Production Engineers, which means that provided there is the necessary co-operation within the Department, a blend should be obtained between technical and practical ideas.

To my mind, this combination of theory and practice is most important, as when introducing new methods, not only must the jigs, tools, etc., be designed and manufactured, but the actual operations should be demonstrated on the shop floor.

Suggestions from workpeople should be encouraged, and the Methods Team should bear the responsibility for implementing these suggestions.

VALUE OF WORKERS' SUGGESTIONS

Whilst on this question of workpeoples' suggestions, let me say how much I deplore the attitude towards these suggestions that I sometimes encounter amongst technical personnel and foremen. They seem to take it as a personal insult that anyone beneath them could possibly have an idea that had not occurred to them. This attitude is not only stupid but dangerous, as the many worthwhile suggestions which do come from the producers can easily be crushed at the start. Good ideas do not necessarily arise from education. The education is necessary to develop those ideas. That is one of the functions of the Methods Team.

Where a suggestion is really worth while, the reward should be correspondingly large. In short, an honest endeavour should be made to develop all the brains within the organisation, and to remove the prejudices which so often sabotage really sound ideas.

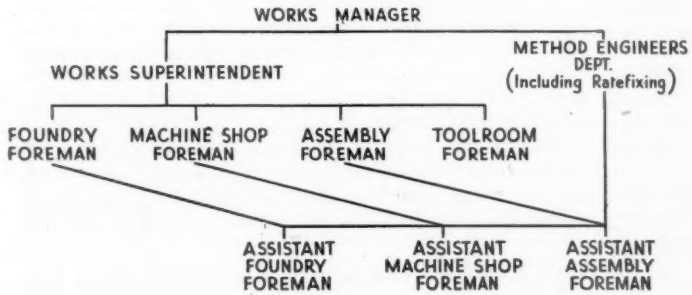


FIG. 2

A typical layout of Works Control is shown in Fig. 2. I have deliberately omitted the Progress, Costs and Stores Departments, as these are not within the scope of this lecture. It will be seen that the Works Superintendent, through his Foreman, controls the administration side of the works. There is an Assistant Foreman in each Department who is junior to the Departmental Foreman, but who deals directly with the Methods Department.

These Assistant Foremen should be young, highly skilled, practical men, with good personality. I feel that this question of personality is most important, as these men have to put over and demonstrate new methods to the workpeople in their Departments, and this in my opinion requires a lot of personality and tact.

A control set-up such as this has many advantages. Firstly, the Junior Personnel have ample opportunity for promotion. Secondly, a dual control in each Department covers emergencies such as sickness. Thirdly, it is possible to send the Assistant Foremen for prolonged training in any new technique before that technique is introduced into the factory. Fourthly, disagreements over piecework times allowed can be settled by demonstration.

Whilst on the subject of piecework, I wish to stress the necessity for providing incentives to an operator when he or she is asked to adopt new methods. One cannot expect the personnel in the factory to have much enthusiasm for new methods unless some proportion of the saving is turned over to them in the form of increased earnings.

I think that it is important to realise that a gradual increase in wage level is bound to arise with increased productivity, and provided that a corresponding reduction is achieved in the production costs, there can be no objection either commercially or otherwise to this state of affairs.

INTRODUCING NEW METHODS

Once a control system such as has been outlined is set up and is working smoothly, the introduction of new methods and techniques becomes almost routine.

Firstly, the Works Manager in consultation with his Works Superintendent and Chief Methods Engineer, decides to introduce some new method into the factory, and at that point it is the Methods Engineer's Department's job to investigate the method fully, order the necessary plant, jigs and tools, and arrange for the Assistant Foremen to visit any outside works to be fully trained in the new technique.

At this point, I must say that I consider it most important that once a new technique has been established it should be applied to every operation possible in the factory. To my mind, it is much

better to introduce fully a small number of new methods to every possible operation, rather than apply many different methods at random.

The small number of new methods applied to the maximum number of operations is obviously the most economical from both a production and financial angle.

Let me put forward another point. Productivity as applied to machine tools can be defined as obtaining the maximum number of finished operations from any given machine over the smallest period of time. With this object in view, non-productive time must rank in importance with productive time. This is particularly so when batches are relatively small, and therefore setting time becomes a large proportion of the hours available for production. The provision of standard " set-ups " in the form of tool kits, easily available and constantly maintained, is therefore worthy of much consideration.

The special tools, etc., locked up in a toolsetter's locker is a very poor practice. He might be on the other shift, off sick, or even dead when next that operation is to be put on the machine. All tool kits, special tools, etc., should be housed in the Tool Store under suitable references and available to everyone.

IMPROVING PRODUCTIVITY

Having talked at some length on the general aspect of increased productivity, I would now like to deal in more detail with two of the methods to improve productivity which, properly introduced into a works, can yield excellent results.

The first method is the general application of carbide turning tools and in order to appreciate what is involved, I believe that a short resumé on the efforts made by the machine tool manufacturers and the actual tool manufacturers to improve the performance of these tools would not come amiss.

Tungsten carbide cutting tools were first introduced in 1927, almost 25 years ago, and at this period their use was very limited for two main reasons. The first was their inherent brittleness, the second was the lack of machine tools which were both rigid and capable of running at very high speeds. These limitations were gradually reduced over a period of years, and eventually it became general knowledge that high cutting speed was an essential condition for the successful use of carbides. While I say it became general knowledge, I find that there exists some confusion in this respect with the personnel responsible for applying carbide tools, even to this day. I think that the difficulty arises from the fact that tool troubles with high speed steel are usually obviated by using reduced cutting speeds, whereas the opposite applies with carbides and increases in speed frequently improve the performance. The

machine tool designers have obviously tackled their problem, and most of the machines which have been installed over the last fifteen years have a top range of speeds suitable for use with carbides. In a number of other instances it is possible to obtain from the machine tool manufacturer two-speed motors which will give a high and low range of speeds on existing machines.

The cutting tool manufacturers have also made great strides in producing better and more varied grades of tungsten carbide tips, mounted on ever stronger tool shanks. The endeavour to obtain maximum support for the tooltip led to a gradual reduction of positive top rake on cutting tools to zero, and finally to negative rake.

I wish to emphasise this gradual change, as there appears to be a widespread impression that negative rake cutting is something revolutionary. There is no sudden change in cutting conditions between positive and negative rake tools. Both tools operate principally by shearing and there is no essential difference in operation. The use of low top rake encourages the softening of the work and chip adjacent to the tool nose, and improves the machinability of the material if this can be readily softened by heat.

INFLUENCE OF CARBIDE DEVELOPMENT

Machines for producing components from bar stock have been greatly affected by the development of carbides, as the material being machined usually lends itself readily to high turning speeds. Bar lathes rely on roller steady turning box tools for most parallel turning operations, and in recent years such tools have been completely redesigned to take advantage of carbide tools.

Fig. 3 shows one of the latest types of box tools designed to use carbide tools. The tool used in this box is termed a " chipstream tool ", and probably gets its name from the " V " groove ground in the top cutting face, which both assists in the natural coiling of the turnings and directs them away from the workpiece.

The tool is presented tangentially to the work and absorbs the cutting pressure through its strongest section, i.e. straight down the shank.

The rollers are mounted on grease lubricated needle roller bearings.

Provision is also made by means of the tool slide and lever to withdraw the tipped tool, avoiding the danger of chipping the tool and marking the workpiece when the tool is withdrawn at the end of a cut.

Fig. 4 shows a close-up of the chipstream tool itself. It will be seen that it is a flat top negative rake tool with a " V " groove ground in the top face, leaving a narrow land parallel to the cutting

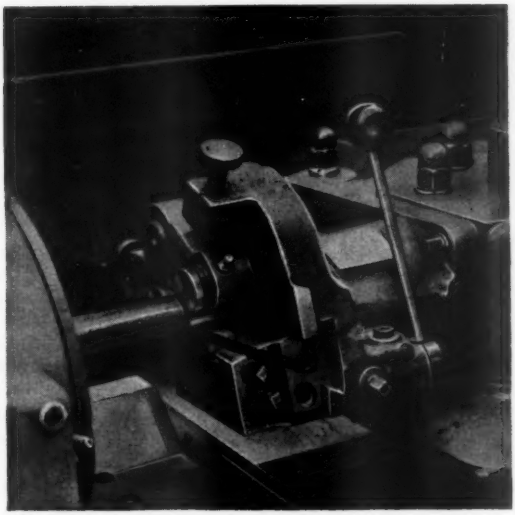


FIG. 3

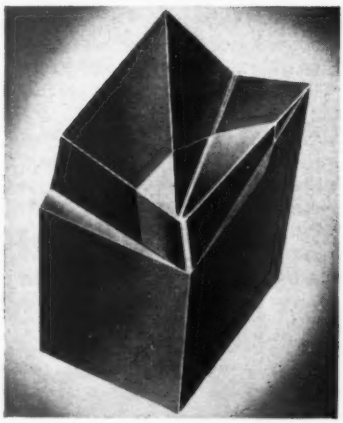


FIG. 4

edge. The maintenance of this land, which should be about 15/20 thousandths of an inch wide, is most important, as is also the maintenance of the radius on the tool nose of about $\frac{1}{32}$ in. In addition to this, a land of about 5 thousandths of an inch at 45° is provided right round the cutting edge. This operation is normally carried out by a diamond hand hone.

Fig. 5 illustrates the type of coiled chips which can be expected providing the tool is properly ground.

Fig. 6 shows a worn chip-stream tool, indicating the type of crater which forms near the nose of the tool, and it is claimed

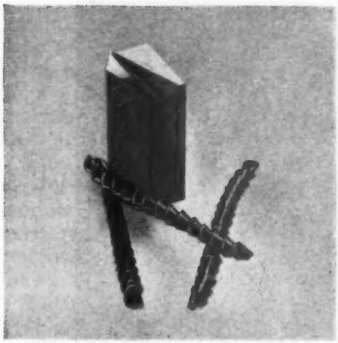


FIG. 5

that the groove ground in the top face of the tool forms what is, in effect, a natural crater, reducing the friction of the chips and thereby improving tool life.

In addition to the improvements in roller box tool design, special tool posts have now been designed to permit the use of tangential turning and cutting off tools with the object of giving maximum support to the tool tips.

Fig. 7 shows a tangential rear tool post designed to be used in conjunction with the chipstream tool. The tool is held in an inverted position, which means it can be operated with the machine runnin gin the normal direction.

Fig. 8 illustrates the same tool in use and provided with a chip breaker which breaks the coil chips into suitable lengths for easy disposal.

Fig. 9 shows another rear tool post designed to take a tangential cutting off tool with carbide tips. In this case the cutting off operation is carried out with the machine running in reverse. Fig. 9a shows a close-up of the tools.

It is interesting to note that the top face of the tool is ground to a 4° angle at each side of the centre line, and the cutting edges are chamfered to give a 5 thousandths of an inch flat at 45° using the same technique as for the chipstream tool.

From the foregoing, it will be appreciated that the introduction of carbide into a machine shop on a large scale is a highly complicated business which requires a considerable amount of personnel training if optimum results are to be obtained.

Correct grinding techniques

FIG. 6

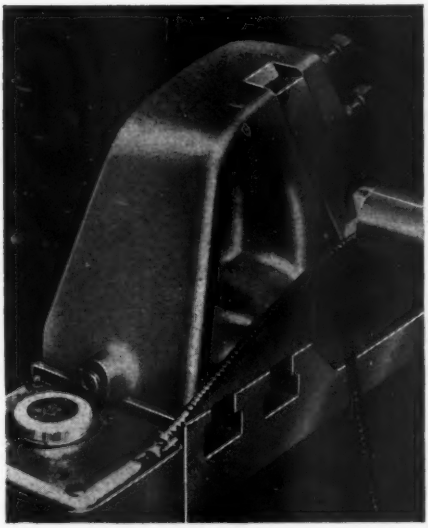


FIG. 7

must be established and the necessary equipment provided. The grinding of the tools is, in my opinion, a job which can only be satisfactorily carried out in the toolroom. An adequate supply of spare tools should be available to avoid delays.

The application of the tools to the various operations is largely a matter of experiment and experience, the important thing being that once the Methods Engineer has established the technique on an operation, all the details including the feeds and speeds should be recorded and made available to the operator or toolsetter each time that operation is put on the machine. The technique should be rigidly adhered to and only altered in consultation with the Methods Engineer. The reason for this is to ensure that the records of the technique are altered also, and is not meant to indicate that the setters or operators are denied the opportunity of improving the set-up.

INCREASED WAGE LEVEL

Earlier in this paper I said that an increased wage level would of necessity go with increased productivity.

In addition to this, very often as operation times are improved, increased fatigue to the operator becomes a major problem. Having

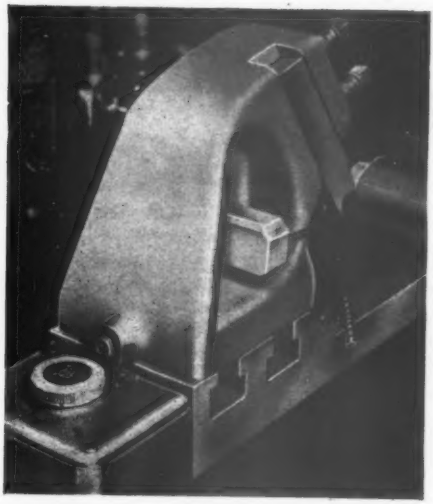


FIG. 8

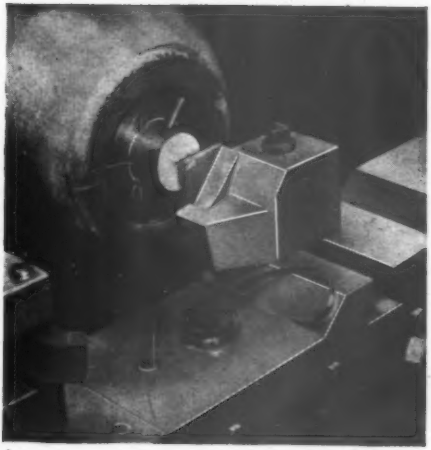


FIG. 9

this in mind, our Company has paid increasing attention to this problem and one of the solutions was the introduction of air-operated chucks, jigs and fixtures. The first essential of this introduction was the provision of a compressed air point at every machine in the Machine Shop, and every vice in the Assembly Department. The next step was to equip all the chucking machines having short operation cycles with the air chucks, and finally a section of the Toolroom personnel was trained in the adaptation of compressed air equipment to jigs and fixtures. These toolmakers were then given the task of improving our existing methods on these lines. The results achieved exceeded all expectations. The men concerned became compressed air enthusiasts. Not only did they provide power-operated fixtures, but in the process ideas emerged which resulted in improved techniques and increased productivity. Suggestions as to possible applications began to come from the operators actually using these tools. This served as a pointer towards the results that could be obtained by training skilled craftsmen to a technique and concentrating their efforts on its application. The new methods, allied to the years of experience which these men possessed, paid big dividends. The following illustrations show a few of the improvements which were effected.

FIG. 9a

Fig. 10 shows a very simple application, the fixture shown merely replacing an ordinary machine vice fitted with special jaws, but when it is appreciated that the operator had to open and close this vice once per minute whilst performing this milling operation, it will be seen that the saving in fatigue and time was fairly considerable.

I should mention here that these air cylinders, control valves, piping, etc., can all be purchased as standard products.

Fig. 11 shows an air cylinder adapted to a collet type of fixture. The opening and closing of the collet is effected by a wedge attached to the piston and operating between rollers. The actuating handle is seen on the right. This fixture serves as a good example of the

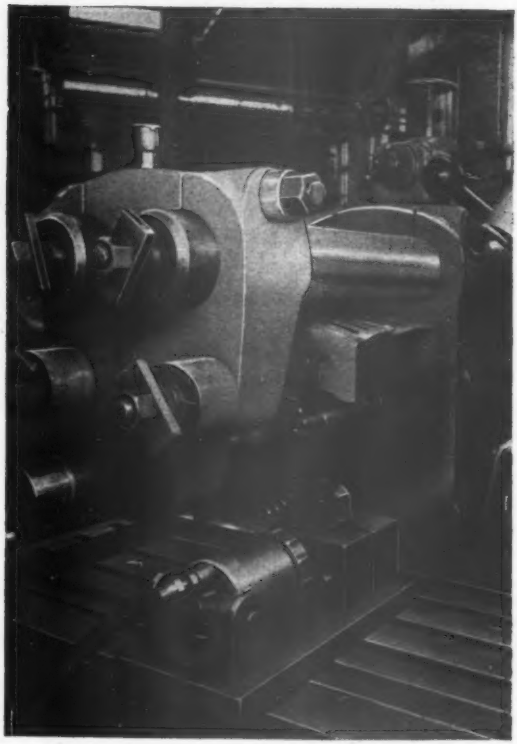


FIG. 10

improvement effected by the toolmaker's ingenuity. The fixture replaces one indexed in the normal fashion by hand, whereas the new fixture was made to index by means of the pins shown just below the component itself and the cam attached to the column of the machine. In the illustration the cam has been moved to the right to make it clearly visible, and it is not shown in its working position. The cutter guards have also been lifted to clarify the picture. It will be seen that the fixture is very simple to operate, and that each time the table is returned after having taken a cut the component is automatically indexed in position for the next cut.

Fig. 12 shows a two-station tapping fixture to tap eight holes in a

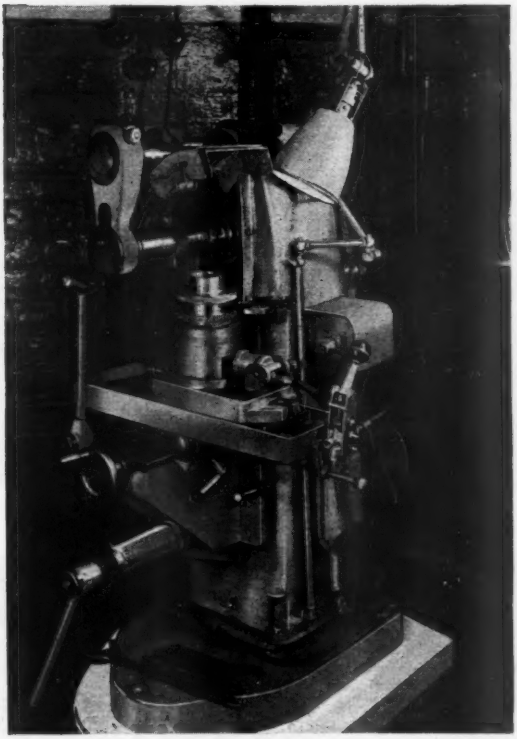


FIG. 11

zinc diecasting. In this case the component is merely held in place by the piston of the air cylinder, which is actuated when the table is raised to the tapping position. The actuating valve cannot be seen in the illustration, but it is fitted beneath the table and operated in the normal manner by means of a cam.

Fig. 13 shows the same fixture with the table raised into the tapping position, and it will be noticed that the piston on the left is now applying pressure to the component. A finished component is seen on the right of the table, as is also a blow gun which facilitates the cleaning of the taps and the removal of swarf from the fixture itself.

FIG. 12

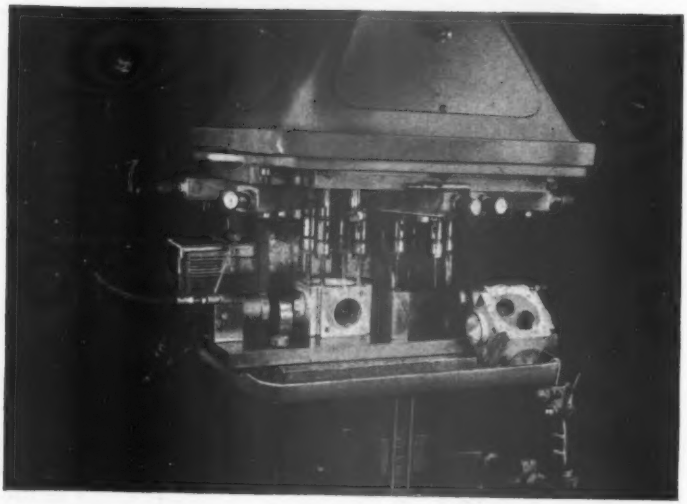


FIG. 13

FIG. 14

Fig. 14 shows a fixture for drilling and tapping four electrical contact pins at the same time. The four pins are held in "V" blocks operated by the air cylinder. The fixture is shown in the drilling position.

Fig. 15 shows the same fixture in the tapping position. The sample component is seen on the left of the table and it will be noted that there are two holes to drill and tap in each component. The location for the drilling of the two holes is clearly seen on the squared ram at the left of the picture. The taps are positioned by eye and the fixture allowed to float during tapping. This fixture was designed and manufactured by one of our toolmakers, the components having been previously drilled singly on a two-spindled

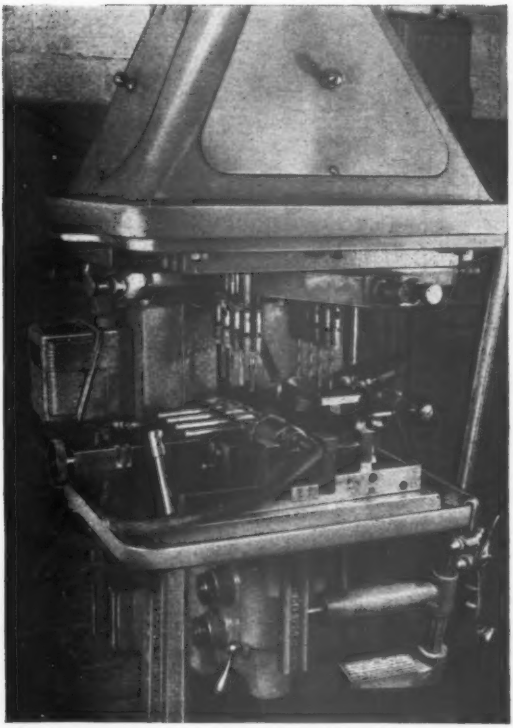


FIG. 15

drilling machine, one spindle carrying the drill and the other the tap. Prior to the idea for drilling these components in quantities of four, the close proximity of the two holes had caused the operation to be disregarded as a possibility on a multi-spindle drill.

Fig. 16 shows an air-operated assembly fixture. This fixture is actuated by means of a foot pedal beneath the bench. The component is an electrical contact tube and it is required to fit a spring ring and two grub screws. The tube is first placed in the fixture as shown and turned to bring the two grub screw holes beneath the two holes in the top plate. The screws are then simply dropped into these holes and driven home by the pneumatic screwdriver seen on the right. The spring ring is then placed between the tapered

plunger and the tube itself. When the foot pedal is operated, the tapered plunger and the main plunger move forward expanding the ring on to the taper. This continues until the tapered plunger has reached the end of the contact tube. This plunger, being loaded by a spring, then ceases to move and the main plunger forces the spring ring into position in the groove. This is actually a simple fixture, but a very effective one.

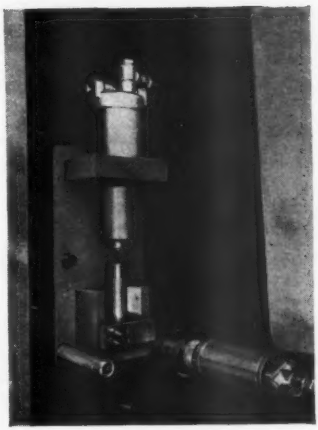


FIG. 16

CONCLUSION In conclusion, I would say that I have endeavoured to impress upon you that much increased productivity can be obtained from first-class practical men, properly trained and supplied with technical information, operating on the workshop floor with the *sole* object of introducing better methods and imparting their knowledge to the operators themselves.

Most, indeed all, of the machine tool manufacturers, will gladly give specialist tuition to such men, and if we do not exploit this expert advice to the full, we cannot hope to get the maximum results from the machines or people in our workshops. We should not be reluctant to accept specialist advice. It is to be expected that the men who concentrate their activities on a small field of engineering become more expert in that field than the engineer who must, of necessity, cover a wide field. Let us not forget that we are really servants of the actual producer whose " productivity " is the measure of our efficiency. We should, therefore, ensure that no effort is spared to educate him to his job and to supply him with the best possible machines and tools. Having done this and provided him with reasonable incentives, coupled with encouragement, our desire for increased productivity should be readily achieved.

ELECTION OF MEMBERS

24th January, 1952

The following were elected to Membership by Council :—

ADELAIDE SECTION

As Graduate :
I. H. Packham.

New Affiliated Firms :	Affiliate Representatives :
Apac Industries Ltd.	G. G. Inkster, R. W. Cook.
British Tube Mills (Aust.) Pty. Ltd. ...	J. G. Gosse, E. O. Burnard.
Chrysler Aust. Ltd.	A. B. Barker, D. L. Elix.
Carr Fastener Co. of Aust. Ltd. ...	D. W. Davey, E. A. Marrett.
Pascoe & Co., Ltd.	W. E. H. Pascoe.
Philips Electrical Industries of Aust. Pty. Ltd.	A. Johnston, Z. Golley.
Rubery Owen & Kemsley Pty. Ltd. ...	K. A. Fieldhouse, K. J. Lewis.
Tecalemit (A'asia) Pty. Ltd.	A. L. McCormack, L. Baker.
Wiles Manf. Co., Ltd.	J. L. Nayler, J. T. Adolph.

BIRMINGHAM SECTION

As Associate Member :
W. H. Vale.
As Associate :
W. Blackwell.
As Graduates :
A. Cooper, P. A. Hill, H. Moore, A. S. Pitwood.
As Student :
S. Wills.
Transfers :
From Associate Member to Member :
H. Unsworth.
From Student to Graduate :
P. J. Cashmore, D. L. Evans, E. S. Slater.

BOMBAY SECTION

As Associate Member :
E. A. Brackley, S. S. Gadgil, B. L. Mandke.
As Graduate :
V. P. Goyal.
As Student :
Y. S. Kothiala, F. S. Sethna.
Re-instatement as Graduate :
B. J. Stedman.
Transfer :
From Associate Member to Member :
R. A. P. Misra.

CALCUTTA SECTION

As Associate Members :
J. C. Bell, P. Bhattacharji, W. S. Brown.
As Graduates :
P. D. Gogya, I. S. Gupta, S. H. Shah.
As Student :
V. S. Bhargav.

CORNWALL SECTION

AFFILIATED FIRM : ADDITIONAL AFFILIATE REPRESENTATIVES :
Holman Bros. ... ... J. T. Holman, N. P. T. Holman, R. C. Holman.
TRANSFER :
FROM INTERMEDIATE ASSOCIATE MEMBER TO ASSOCIATE MEMBER :
C. A. Whitford.

COVENTRY SECTION

AS ASSOCIATE MEMBERS :
H. E. Chapman, A. G. Wallis.
AS STUDENTS :
C. R. Dyer, B. J. Orr, N. E. Tyler.
TRANSFERS :
FROM GRADUATE TO ASSOCIATE MEMBER :
R. W. Gilkes, N. H. Horton, C. J. Kirk.
FROM STUDENT TO GRADUATE :
D. Kitchen, C. Peters.

DERBY SECTION

AS ASSOCIATE MEMBERS :
G. F. Ashmole, E. J. Bazeley.
AS GRADUATES :
P. D. Harrison, A. Partington, W. F. Radford, C. K. W. Scott, R. G. Williams.
AS STUDENTS :
G. J. Hudson, E. Lancashire.
TRANSFER :
FROM ASSOCIATE MEMBER TO MEMBER :
E. J. Higgins.

DUNDEE SECTION

TRANSFER :
FROM ASSOCIATE MEMBER TO MEMBER :
J. Butler.

EASTERN COUNTIES SECTION

AS ASSOCIATE MEMBER :
H. W. Moore.

EDINBURGH SECTION

AS STUDENTS :
A. G. Taylor, T. Thompson.

GLASGOW SECTION

AS GRADUATES :
M. Coll, J. M. Miller.
AFFILIATED FIRM : CHANGE OF AFFILIATE REPRESENTATIVE :
T. White & Sons Ltd. ... ... W. Querns.
TRANSFER :
FROM INTERMEDIATE ASSOCIATE MEMBER TO ASSOCIATE MEMBER :
D. R. C. Snowden.

HALIFAX SECTION

AS ASSOCIATE MEMBER :
J. Lister.
AFFILIATED FIRM : ADDITIONAL AFFILIATE REPRESENTATIVE :
Denhams Engineering Co. Ltd. ... G. Denham.
TRANSFER :
FROM GRADUATE TO ASSOCIATE MEMBER :
E. R. Eccles.

LEICESTER SECTION

As Graduates :
M. A. Chaudhry, W. F. Burman, D. E. H. Pauffley, D. Rogers.

Affiliated Firms :	Additional Affiliate Representative
Adcock & Shipley Ltd.... ...	... R. S. Bent.
Wadkin Ltd.	... W. L. Sims.

Transfers :
From Graduate to Associate Member :
E. Cars.
Successful Candidate in 1951 Associate Membership Examination :
From Student to Graduate :
J. L. Dryden.

LINCOLN SECTION

As Student :
D. H. Wheatcroft.

LIVERPOOL SECTION

As Student :
F. Tilston.
Transfer :
From Graduate to Associate Member :
D. H. Ryder.

LONDON SECTION

As Members :
R. M. Currie, R. M. Dennis, Sir Cecil Weir.
As Associate Members :
L. W. Ballard, W. M. Barnes, J. N. Colledge, J. F. Johnson, H. Mathews, W. H. Sutton, W. E. West.
As Graduates :
M. W. Alderdice, E. E. Allen, B. W. Charman, J. S. Harman, P. C. Kilby, R. H. F. Lee, M. W. G. Lewis, H. I. More, G. J. Paull, D. R. Portman.
As Students :
P. J. Galliford, D. St. A. Hunt, T. J. Julier.
Transfers :
From Associate Member to Member :
G. A. Hutcheson.
From Intermediate Associate Member to Associate Member :
W. P. Shead.
From Graduate to Associate Member :
V. A. Bavington, B. A. Gittins, T. L. Isaacs, J. Rogers, D. G. I. Rosser, E. H. Wootton.

LUTON SECTION

As Students :
B. D. Day, P. Hill.
Transfer :
From Intermediate Associate Member to Associate Member :
J. L. Merrett.

MANCHESTER SECTION

As Member :
G. Verdon-Roe.
As Associate Members :
J. Fowler, F. Higham, C. H. Sayers.
As Graduates :
G. Blemmings, J. C. Moxon.

As Students :
L. E. Chadderton, J. H. Hoyle, W. Lord, R. K. Stephenson, V. J. Crowsley.
Affiliated Firm : Change of Affiliate Representative :
Metropolitan-Vickers Electrical Co. Ltd. A. C. Annis.
Transfers :
From Intermediate Associate Member to Associate Member :
J. Hewitt.
From Graduate to Associate Member :
J. Renouprez.
From Student to Graduate :
W. Moore, J. P. Rochford.

MELBOURNE SECTION

As Member :
Sir John Storey.
New Affiliated Firm : Affiliate Representatives :
Industrial Service Engineers Pty. Ltd. W. Dickins, K. S. Duncan.

NORTH EASTERN SECTION

As Associate Members :
A. W. Thompson, W. P. Whenray.

NORTHERN IRELAND SECTION

Transfer :
From Associate Member to Member :
S. Annesley.

PRESTON SECTION

As Associate Members :
C. E. E. Bracken, W. Pilkington, J. I. Schofield.
As Graduates :
I. C. Broughton, A. Ormerod.
As Students :
R. Copeman, R. J. Hindle, G. B. Shepherd, J. Weir.
Transfer :
From Graduate to Associate Member :
E. C. Taylor.

READING SECTION

As Associate Members :
Maj. R. J. F. K. Cornwall, C. L. Cox.
Transfers :
From Associate Member to Member :
W. R. Deione.
From Student to Graduate :
P. M. Wood.

ROCHESTER SUB-SECTION

As Associate Member :
C. Scott.

SHEFFIELD SECTION

As Associate Member :
W. E. Davis.
As Graduates :
H. P. Boyce, J. D. Heys.
Transfers :
From Associate Member to Member :
J. Lonsdale.
From Student to Graduate :
M. D. Drinkwater.

SOUTHERN SECTION

As Member :
J. A. McIntyre.
As Associate Member:
A. Black.
As Student:
A. F. White.
Transfers :
From Intermediate Associate Member to Associate Member :
H. Jones, W. E. Smith.
From Graduate to Associate Member :
W. T. Scarr.

SOUTH ESSEX SUB-SECTION

As Associate Members :
J. Aikman, R. H. G. Cox.
As Graduate :
R. T. W. Morrison.
As Student :
P. A. Taylor.
Transfers :
From Student to Graduate :
R. A. Kean, J. Struthers.

SOUTH WALES SECTION

As Associate Member :
T. A. Clissold.
As Graduate :
H. F. Sturt.

STOKE-ON-TRENT SUB-SECTION

As Graduate :
R. P. Shaw.

SYDNEY SECTION

As Member :
C. D. Smith.
As Associate Members :
R. A. Chalmers, G. W. B. Kenyon.
As Students :
J. C. Evans, J. G. Garlick.

WESTERN SECTION

As Members :
S. G. E. Nash, F. H. G. Sedgwick.
As Associate Member :
E. G. Herbert.

WOLVERHAMPTON SECTION

As Member :
H. Sutton.
As Graduate :
J. G. Beasley.
As Students :
J. S. Fereday, L. P. Hulse, W. R. James, R. G. Wilbrey.
Transfers:
From Associate Member to Member :
H. Hale.
From Intermediate Associate Member to Associate Member :
P. A. Tipper.
From Graduate to Associate Member :
W. T. Vaughan.

YORKSHIRE SECTION

As Associate Member :
D. K. Sanders.
As Graduate :
J. A. Waite.
As Students :
A. Barton, B. Cleaver, A. Tooley.
Transfer :
From Student to Graduate :
J. W. Sharp.

NO SECTION

As Associate Member :
R. Kennett.
As Students :
A. B. Arthur, H. N. Smit.
Transfers :
From Associate Member to Member :
D. C. Ling.
From Graduate to Associate Member :
D. Foulger.

LOCAL SECTION REPORTS

Presented to Council, 24th January, 1952

Adelaide

Since submitting the last Quarterly Report, the President and Officers for 1952 have been elected. Mr. W. Gwinnett has been re-elected President, and Mr. Law, retiring from the post of Honorary Secretary, has been elected Vice-President.

The Adelaide Section continues to grow and it is felt that the first year of operation has been a good one. There are now 41 members.

Meetings have been well attended, the average attendance throughout the year being 70. The drive for new members is continuing and a good programme has been prepared, which it is hoped will be of assistance in attracting new members.

Birmingham

The high standard of papers presented, set by Mr. W. J. Morgan in September, continues to be maintained and in October members heard a paper of general interest on "The History and Manufacture of Watches" ably presented by Mr. A. W. Marshall. The November paper was contributed by Professor J. R. Immer and entitled "The Production Team." Over 200 local executives were among the visitors at this lecture, which was held in the Birmingham College of Technology. The Institution Display Panels upon Material Saving were shown at this lecture and attracted considerable interest. These panels remained on show for a few days for the benefit of engineering students at the College.

On 10th January, the Section took part in a joint meeting with the Institute of Cost and Works Accountants, when Mr. A. B. Waring, Managing Director, Joseph Lucas Ltd., gave an address on "Industrial Management and the Accountant." The Committee are investigating the possibility of co-operating with the Extra-Mural Department of the University of Birmingham in the arrangement of lecture courses of value to Production Engineers.

The Section Committee were guests at a joint meeting with the Wolverhampton Section Committee recently, when Mr. H. Burke presented the report of the Institution on the Special Committee on Organisation. After a full discussion, the joint meeting approved the report and commended the Special Committee upon their work.

The autumn social event, the Buffet Dance on 3rd November, was most successful.

Bombay

All steps are now being taken to organise the Bombay Graduate Section on a proper basis, and reports on progress will of course be submitted at regular intervals. The running of the Graduate Section is being carried out by Mr. S. G. Barbet, A.M.I.Prod.E., and it is anticipated that the activities will be conducted with Mr. Barbet's usual efficiency and enthusiasm.

Since making the last report, considerable difficulty has been experienced in maintaining what, in the past, has been the most satisfactory venue for the meetings of the Section, owing to the strict electricity cuts which have been enforced in Bombay. Negotiations with the B.E.S. & T. undertaking have been successful and the Section have been able to obtain the continuance of the use of their Conference Hall subject only to agreement to the shutting off of the fans and air-conditioning unit. This state of affairs is likely to continue until the monsoon breaks at the end of June, 1952.

In October, 1951, a further discussion meeting was held dealing with day-to-day problems met with in the ferrous and non-ferrous foundry industry. Mr. J. H. King again took the Chair for the duration of the discussions and a most lively meeting

ensued. Mr. A. J. Lund, M.I.Prod.E., gave a most interesting talk in December on the progress of the diesel engine, followed by a very finely produced film.

Membership applications continue to be received at a satisfactory rate and elections to the Bombay Section have now topped the century mark, which is felt by the President and Committee to be a very healthy sign when it is considered that the Bombay Section has only been in operation for some two and a half years.

Calcutta

The Honorary Secretary returned from the United Kingdom in November and due thanks were given to Mr. E. W. H. Scaife, Grad.I.Prod.E., who had very kindly acted in his place.

A number of applications for membership have been received and have been dealt with in Committee.

During the quarter under review, one Section Meeting was held on the 29th November, at which Mr. N. N. Sen Gupta read Mr. C. A. Packer's paper entitled "Apprentice Training." The meeting was held in the Calcutta Technical School, and in addition to the Institution members, students of the school were present. A full Working Committee Meeting was held on the 13th December, at which future Section Meetings and Works Visits were planned for the New Year and these are being arranged up to May, 1952.

At a Committee meeting held in November, the possibilities of forming a Graduate Section were discussed at length. The Graduate and Student members of the Institution in Calcutta amounted to 15 only and it was felt that this number should be increased before a Section was formed. This question was again raised in December and Mr. Sen Gupta promised to give a report at the next Committee meeting in the New Year.

Canada—U.S.A. Group

The period dealt with in this report, being the holiday season, shows activity at a minimum. The Committee has met on three occasions.

Members are very sorry that the Chairman, Mr. E. A. Young, is again ill and unable to attend meetings of Committee or functions of the Group.

As a means of keeping members of this Continent informed of progress, it was thought that the *Journal* should be used exclusively.

On 3rd November members took part in a visit to the plant of A. V. Roe Canada Ltd., and had the opportunity to see the system of manufacture for the Orenda gas turbine engine. Following the visit an informal dinner was held at the Royal York Hotel, Toronto.

The Honorary Secretary is pleased to record in this Report the success attained by Mr. G. N. Johnson, Grad.I.Prod.E., in being awarded the Lord Austin Prize 1950 for the Best Essay by a Graduate for his essay entitled "Production Economy in Aircraft Production." Mr. Johnson, until his recent return to Great Britain, was a resident in Canada at the time of writing the Essay and a member of the Canada—U.S.A. Group.

It is learned from London Office that the President of the Institution, Major General K. C. Appleyard, is visiting Canada and will address members of the Group.

The number of members now in Canada totals 63 and in the U.S.A., 17.

The Committee now consists of the following :—

Chairman, E. A. Young ; Honorary Secretary, T. H. Beard ; Messrs. R. B. Spiro, C. J. Luby, F. D. H. Ronald, W. M. Buchanan, R. Nelson, S. S. Pritchard, H. A. Turner.

The next function planned is a visit to the plant of Canadian Acme Screw and Gear Co., Ltd., Toronto, in January, 1952.

Cornwall

Section Meetings have been held regularly each month and they have been well attended by members and visitors.

In October Mr. E. Clarke of Alfred Herbert Ltd., Coventry, spoke on " Metrology." Mr. Clarke had a very appreciative audience, as a metrology room is contemplated at The Cornwall Technical College and this will no doubt assist junior members of the Section in their preparation for the Institution's Associate Membership Examination. A local discussion on Production Control was held in November. This resulted in a wide interchange of views on many aspects of the subject, many members taking part in what proved to be a very animated discussion.

Mr. John Bright, the Chief Factory Layout Engineer of Joseph Lucas Ltd., visited the Section in December and delivered an address on " Mechanical Handling and Work Movement." Mr. Bright enumerated the many ways in which much time, effort, and manpower is generally wasted in all industries, and pointed out the necessity for everyone concerned to do something to improve matters.

Coventry

It was unfortunate that the joint lecture with the Institute of Cost and Works Accountants on 17th October clashed with the Graduate Section's " Open Papers " evening in connection with the local award presented annually by Mr. Douglas D. Davis. Three of the Section Committee members adjudicated three papers of quite a good standard ; the decision, however, was unanimous. Incidentally, it was with regret that Mr. Davis's resignation from the Committee, due to municipal commitments, was accepted.

The lecture, " Factory Layout " by Mr. R. Gore, A.M.I.Mech.E., in October, attracted a capacity audience. Based on the new Vauxhall factory, this lecture was followed by a most interesting film, clearly illustrating certain sections of the plant and at the same time amplifying the general scheme behind the whole layout. " Preservation and Packing " formed the subject of the November lecture delivered by Mr. F. Chapman of Birmingham. Considerable interest in the various processes was shown during a lively discussion, and it is apparent that whilst a considerable amount of standardisation has been effected, new methods and materials are continually being developed.

The first of the two lectures to be held in Rugby this Session was delivered by Mr. B. C. Harrison, M.I.Prod.E. The subject, " Planning for Batch Production," was well received by an audience of encouraging size and an animated discussion followed.

It is pleasing to note that one of this Section's Graduates, Mr. D. Wood, has entered a paper for the Schofield Travel Scholarship and the Section wishes him the best of luck.

During December, the Committee were pleased to invite Mr. H. Burke, Vice-Chairman of Council, and Mr. T. B. Worth, Institution Education Officer, to meetings when important business was discussed.

On the social side, a Dance was held on 29th October, and an enjoyable evening resulted for those present.

Coventry Graduate

The 1951-52 Session opened with a " Production Panel "—in which eminent senior members of the Institution were invited to form a team and answer questions on any aspects of Production Engineering. This, without doubt, has proved to be the most successful meeting of the Session up to date. Some provocative questions, upon which Graduates wanted to be enlightened, were answered in a first-class manner by the members of the team.

The Douglas D. Davis Award—Open Papers evening, was held on 17th October. Three Graduates read short papers and also answered questions. The adjudicators gave the award to Mr. A. Gulliver for his paper on " Machine Tool Reconditioning."

In November an excellent lecture was given by Mr. J. Silver on " The Production of a High Performance British Sports Car—The XK120 Jaguar." This lecture provided some lively discussions and was very well attended.

Eastern Counties

In October a special meeting was held in Norwich to explore the possibilities of forming a Sub-Section in that area. Mr. E. C. Gordon England lectured on " Valid Incentives " before a large audience of members and visitors. As a result of this successful venture, a Sub-Section is being formed in Norwich under the Chairmanship of Mr. C. Frewer, with Mr. K. R. Addison as Honorary Secretary. A Committee is being formed and a lecture programme for the remainder of the Session has been arranged.

In November, Mr. A. H. Leggett delivered his Presidential Address, entitled " Growth of a Business." This meeting was well attended and a very interesting discussion followed. The annual meeting at Colchester was held during December, when Mr. G. W. Bone lectured on " Some Impressions of Engineering in Canada." This meeting was again held jointly with the Colchester Engineering Society. Unfortunately, due to bad weather, the Ipswich party was unable to make the journey, and the Vice-President, Mr. E. N. Farrar, kindly deputised as Chairman.

A special Committee meeting was held during December, when the proposed new regional organisation was fully discussed.

Edinburgh

During the present programme to date there have been four visits and two lectures, both the latter being fairly well attended. This question of attendance in such a small Section becomes one of major importance and it is considered that some 30 people at the first and slightly over 40 at the second lecture is certainly quite comparable with the more industrial centres.

The Works Visits certainly merit more attention. However, with a more extensive campaign of works' notices, it is hoped to increase numbers at meetings.

There is a steady influx of membership applications and there is no doubt that the Section can confidently expect consistently increasing numbers.

Glasgow

Three lecture meetings and a film night have been held during this quarter. At the October meeting an interesting paper entitled " Diamonds in Industry " was read by Mr. A. M. Livingston. The November lecture given by Mr. R. C. Fenton on " Some Interesting Set-ups on Modern Machine Tools " was most interesting and created a good discussion. In December, members of the Section had the opportunity of hearing a talk on " Legal Aspects in Industry " by Mr. A. E. Armour.

Mr. D. S. Gardner and Mr. J. Menzies have been co-opted to the Glasgow Section Committee for the remainder of the Session 1951-52.

Applications for Membership continue to be received at a satisfactory rate.

Halifax

The close of 1951 brings the Section half way through the lecture programme, and the Halifax Section Committee feel that so far there have been satisfactory attendances and the joint meeting arranged with David Brown Tractors Engineering Society was again a popular feature.

Owing to a clashing of dates, the annual Dinner and Dance originally arranged for November was postponed to March, 1952.

The Senior Section Committee meet periodically and were almost 100 per cent. strong when it recently met to discuss the report of the Special Committee on Organisation ; after very thorough deliberation, the hope was expressed that this is a sign that a new era is about to begin, and thanks were expressed for the tremendous amount of time and thought put into this Report by the Special Committee.

A very special drive is being made by the newly appointed Graduate Chairman and Secretary. Although it was decided to have a joint lecture programme with the Senior Section, a special Graduate lecture has now been arranged for January.

Halifax Graduate

At the first meeting of the Committee this Session it was resolved that the Committee should meet not less than once every four weeks during their term of office, and this has been carried out. The first two Committee meetings of the Session were concerned mainly with formulating some policy and general course of action, based whenever possible upon the recommendations of the Graduate Representatives Conference of last year.

It is as yet too early in the Session to say whether any of the proposals put forward at the Graduate Conference are going to lead to any forward step or not. However, it was determined that two representatives should be sent to the 1952 Graduate Conference and Mr. J. E. Senior and the Section Honorary Secretary were elected.

A Sub-Committee met to consider what could be brought forward at the Conference, but it was felt that, before a definite report was put forward, an opinion from the Section members would be of assistance. Accordingly a study group is being organised to go thoroughly into the theme of the Conference, i.e., " Graduate Participation in Institution Affairs."

It is now felt by the Committee that an Annual Social event should be arranged, so a Dinner and Dance has been organised ; Mr. J. Hepper was elected Social and Visits Secretary. A lecture has been arranged for January 2nd, entitled " Modern Welding " and a preview of the films to be shown was given to the Committee by Mr. A. E. Cunningham of Crompton Parkinson Ltd. The arranging of a week-end school is under consideration and will be discussed with the Senior Section Committee with a view to obtaining their advice. Visits to places of interest to members and their families or friends are to be arranged.

Suggestions have been put forward for holding an " Engineers Forum " and the possibility of holding this in conjunction with another Section is being investigated.

Leicester

Without doubt the outstanding event of the quarter under review was the Annual Dinner held in November, when 125 members and their guests spent a most enjoyable evening. In a speech, Dr. D. F. Galloway, who was the Guest of Honour, paid tribute to the Institution in general and to this Section in particular for its far-sightedness and energies in building up the Production Engineering Research Association at Melton Mowbray. Mr. Harold Burke replied to Dr. Galloway's toast of " The Institution " and Mr. N. A. Cullin replied on behalf of the Section. In replying to the toast of " The Guests," proposed by Mr. W. Bentley, Dr. H. L. Haslegrave commended the Institution's work in the education of young engineers. An unusual and pleasant feature of the Dinner was that a number of firms, both large and small, had sent a party of executives and staff from their works at the firm's expense, and in addition no less than 21 potential student members attended from Loughborough College.

Lectures during the quarter have included Mr. Gordon England's highly controversial " We Must Do Better " and a Brains Trust which answered members' questions on Production Engineering with skill and lucidity.

The Committee has continued its general work with regular meetings and is at the moment considering the report of the Special Committee on Organisation.

Lincoln

Since the last report, the Section has held three meetings. The first of these, on 29th September, took the form of a Saturday afternoon visit to Marshall Sons & Co., Ltd., Gainsborough, and had a representative attendance of 42 members, including members from Stamford.

In October, there was a joint meeting in Lincoln with the Institute of British Foundrymen, at which Mr. Rattlidge and Mr. Mantle, members of the Brass Foundry Productivity Team, gave a lecture entitled " The Craftmanship of Output Applied to American Brass Foundry Work." This lecture was followed by a colour film produced by the Productivity Team during their tour of the U.S.A. The meeting

was particularly well attended and the visitors were entertained to a buffet supper. The November meeting took place at Scunthorpe, being arranged with a view to developing the membership of the Institution in the Scunthorpe area. The meeting took the form of a lecture by Mr. Widdowson on " Time and Work Studies with Particular Reference to Heavy Industries." There was an extremely good attendance fully representative of the industry at a high level in the area. The results of the meeting so far are most encouraging and it is confidently expected that a firm footing has now been obtained in the area.

Owing to the pressure of work, Mr. S. E. Willett, Director and General Manager of Clayton Dewandre, who was President Elect of the Lincoln Section, has had to withdraw, although he continues to serve on the Committee. Mr. E. Burgess is now President Elect.

London

This quarter which opens the 1951-52 Winter Session has been extremely disappointing so far as attendances are concerned at lecture meetings held in the centre of London. The attendance at the first two meetings was only about 40 per cent. of usual attendances. An improvement was noted at the third meeting, the figure rising to about 60 per cent. Unfortunately, these percentages do not give a true picture; there have been big demands for visitors' tickets in blocks of eight and more, so that there has been a larger proportion of visitors to these meetings than hitherto. Therefore, attendance of actual members has been extremely low.

This poor attendance clearly indicates the need for restoration of the monthly card.

So far three papers have been given in the centre of London : " Increased Productivity by the Use of Compressed Air " by Mr. N. P. Watts ; " Drop Forging " by Mr. K. Fidler and " High Speed Press Work " by Mr. J. A. Grainger. All of them raised good discussions.

At Brighton, the " Symposium on Modern Metrology " was covered by three speakers, Messrs. C. O. Taylerson, D. F. Galloway and J. Loxham.

An interesting paper " Modern Accounting for the Production Engineer " by Mr. W. Deacon, given at Croydon, drew a substantial audience, but non-members predominated.

Four London Graduates have entered for the 1952 Schofield Travel Scholarships.

There is a feeling amongst Committee Members that use of a thesis to test academic knowledge of applicants for membership should be insisted upon in more instances. This should apply to candidates between the ages of thirty-five and forty whose academic attainments fall short of the Institution Examination standard, and particularly to those whose industrial positions are not above the average for their age.

The " Report of the Special Committee on Organisation " is receiving special attention by the Section Committee ; members are expressing their opinions in writing prior to the holding of a special meeting to consider the Report.

London Graduate

The first two lectures on chipless methods of manufacture have been well attended. It is the opinion of the Section Committee, however, that had information about the lectures not been sent out on Section circulars, the absence of lecture tickets would have resulted in very poor meetings.

An attempt was made to arrange visits to a few famous manufacturers of non-metallic products. Unfortunately, the firms which were approached were only prepared to arrange the cursory walk through selected parts of their factory which they provide for potential customers. Alternative visits have therefore been arranged.

A party of members received a very good welcome when they visited the Cricklewood Works of S. Smith & Sons Ltd., and there is no doubt that much useful information was conveyed to members by the competent guides which were provided.

Because of the success of the two previous Section Week-End Schools, a third School is being arranged and will be held at the Beatrice Webb House, near Dorking, on the 11th and 12th of October, 1952. Accommodation has been booked for 40 members to attend the School.

The Section Technique of Tooling Study Group has been re-formed in order to carry out a new project. The strength of the new Group is 27 members. Charts will be prepared which will show the alternative methods of work locating, clamping, etc., together with the comparative operation times. It is felt that charts of this nature will assist Tool Draughtsmen, Checkers and Tool Makers in selecting the best design for each element of a particular jig or fixture and will also provide useful data for methods engineers and ratefixers.

The Section Committee welcomes the decision to devote a part of the *Journal* to Graduate activities. It is hoped that this will result in an increased interest by Graduate and Student members in the activities of their Sections.

Arrangements are being made for the 1952 Graduate Industrial Tour to take place in the last week of August and the first week of September. Most of the tour will be in Holland, where members can be assured of a very cordial welcome.

Rochester

During the period under review, the Section has held regular monthly lecture meetings and these continue to be well supported.

The Section Committee is endeavouring to increase the membership of the Section and Mr. Wybron, the Chairman, has addressed a personal letter to all Corporate members, asking their assistance in this connection.

The Committee is also discussing the question of the best means of encouraging Graduates to take a more active interest in Institution affairs.

South Essex

Meetings

The first meeting of the 1951 Session was held on 3rd October at the South East Essex Technical College when Mr. Lewis C. Ord gave his paper. The second meeting was held in Chelmsford at the Mid-Essex Technical College when Dr. E. L. Diamond gave his paper on Standardisation. This paper was well received and attracted a record audience. The third meeting of the Session was held in Ilford, to hear a paper on Tungsten Carbide.

General

The attendance at meetings generally has tended to be good for the first part of this year, but the majority of the people attending these meetings are visitors invited by the Committee.

A special Committee Meeting has been held to consider the report regarding Regional Organisation and suggestions and comments are at the present moment being drafted.

Luton

The November meeting drew 120 members and friends to a talk on "Deep Drawing Steel" given in the absence of Dr. Jevons by his Chief Metallurgist.

A rota has been established for the attendance of Senior Section Members at the Graduate Committee Meetings. This practice has been well received, and is in addition to the permanent invitation to the Graduate Chairman and Secretary to attend Senior Committee Meetings.

The courses on Production Engineering subjects at the Luton and South Bedfordshire College of Further Education have been well attended and have resulted in the success of six candidates out of seven sitting for the examination.

Luton Graduate

During the quarter commencing October, 1951, three lectures have been given to the Section, two at Luton and one at St. Albans. All these have been very satisfactory regarding the quality of the papers delivered, and attendance has been reasonable.

The practice of having two Senior Section representatives upon the Graduate Section Committee has been revived, one member being permanent for the

session, the other representative to change each month. The permanent member for this year is Mr. W. Gillespie, Head of the Engineering Department, Luton & South Bedfordshire College for Further Education.

During December, a special Committee meeting was held with the Senior Section representatives and Messrs. S. Caselton and T. B. Worth of Head Office. Means of increasing Graduate interest in the Section's functions was discussed together with ideas for next year's activities. The Head Office and Senior Section's assistance was found to be of the greatest value.

It is hoped that a report of progress of the Study Group will be published in the New Year.

Manchester

Local Activities

In October, Mr. E. Johnson gave his stimulating paper "Some Tapping Experiments—Accurate Thread Production and Breakage Elimination." The results of experiment showed the necessity for correct axial loading when tapping. In November, Mr. M. Venner gave his paper on the "Electron Microscope." Whilst the paper was mainly concerned with the design features, the discussion considered some of the manufacturing difficulties. Mr. Roff gave his paper "Management Ethics" on the 17th December. This was also an interesting paper, considering an aspect of management which is not usually given the attention that it warrants.

It is interesting to note that during this Session the technical representative of the Kemsley Press has been attending meetings regularly.

Five visits have now been made by Messrs. Stoddart, Cranmer and Spencer-Smith in connection with the Machine Tool Advisory Panel.

A special Section Committee meeting was held to consider the Report of the Special Committee on Organisation, and the Section's views are being reported separately.

Membership Growth

The Committee are pleased to note that the normal rate of membership growth has been resumed.

Manchester Graduate

In October a lecture, "Productivity and the Machine Tool," was presented by Mr. N. Stubbs, M.B.E., whose main theme was modern developments in machine tools. Much emphasis was placed in the design of the cutting tools used. The November lecture was by Mr. M. O'C. Horgan, T.D., M.I.E.E. His subject, "Heating Methods in Engineering," was illustrated by a film and numerous interesting examples of components. He confined himself particularly to High Frequency and Radio Frequency Heating Methods and the heating effect of High Frequency was most effectively demonstrated by a working model. The lecture programme was continued in December by Mr. E. A. Taylor, who gave a very excellent lecture entitled "The Corby Iron and Steel Works of Stewarts & Lloyds." Mr. Taylor presented some excellent training film strips and a very good film on the production of the P.L.U.T.O.

Three very interesting works visits have been made to firms in the Manchester area and the future programme is satisfactorily arranged.

North Eastern

It is the aim of the North Eastern Section to encourage as far as possible responsible people within the Section to give lectures and papers. It was, therefore, with considerable pleasure that a large audience, in October, heard Mr. A. Cameron of Victor Products (Wallsend) Ltd., give a very interesting lecture entitled "Increased Productivity by Workshop Practice."

The first Section Dinner Dance took place on 12th December, 1951. It was a splendid success and all in attendance had an enjoyable time. Arrangements are being made to hold a similar event during the 1952-53 Session.

Every effort is being made to encourage men of high standing in the engineering sphere to join the Institution.

North Eastern Graduate

The general meetings this Session have been of a very high standard. The Chairman's address given in September entitled "Some Applications of Compressed Air in Engineering" illustrated by slides, was of a high quality.

In October a "Brains Trust" meeting was held, and this was received with very great enthusiasm. A paper entitled "The Manufacture of Rubber Covered Cables" given in November by a Graduate, was very well received. This was followed by a visit to W. T. Henley's Telegraph Works at Birtley to see in actual practice the manufacture of rubber covered cables. Very great interest was shown in this visit and it was very well attended. In December Mr. D. A. Wrangham, Principal of Sunderland Technical College, gave a lecture entitled "Theory as an Aid to the Solution of Some Practical Problems in Engineering." This meeting proved to be of very great interest, and a most instructive and enjoyable evening ensued.

The North East seems to be advancing more than ever in Production Engineering. Very great extensions are being made to Gateshead Technical College and more Production Engineering Courses are to be held there, when accommodation becomes available. A good series of Production Engineering lectures have just been held at King's College, Newcastle.

Nottingham

This Session the number of members attending meetings has decreased while the number of visitors has correspondingly increased. Although the Committee would like to see many more members taking part in activities, they are not unduly depressed as members are "spreading the gospel" and widening the scope of the Institution in the district.

In November Mr. Woodford and Mr. Caselton paid a visit to the Section and were very well received. The Section looks forward to more visits from officials from London in the near future.

Preston

Lecture Meetings

There has been a most successful first half to the Winter Programme, and all three lectures have been very well put over, arousing very lively discussion. Over 100 members attended the Blackburn lecture given by Dr. Galloway, and the other two lectures drew around 50 members each. This is the first year of holding the meetings in hotel rooms and it appears to be a popular move.

Membership

Membership figures continue to remain well over the 200 mark, and the Section has rather a large number of applications before the next Council Meeting. An increasing number of these are from young men who have obtained Higher National Certificates in Production Engineering, and to whom the Committee look for the future of the Section. The present Graduate strength is around 60, but the widely scattered area covered by the Section precludes any possibility of the formation of a Graduate Section under present conditions.

Graduate Conference

In view of the large number of Graduates, the Section are making every endeavour to send two representatives to the Birmingham conference in March, and the machinery has been set in motion in an attempt to select two interested and suitable Graduates. Without a Graduate Section, such members are not easily reached personally.

Committee Meetings

Meetings have been well attended; each Committee meeting seems to have a larger agenda than its predecessor, and the recent ones have all been blessed with a large number of membership applications in addition to considerable "other business." This seems a fitting point to mention that the Section has lost one of its long serving and very staunch members, Mr. J. E. Fogg, who has taken an

appointment in Sunderland. He has served loyally and very willingly on the Section Committee for a long time.

Reading

Local Activities

There have been three lecture meetings to date. Great interest was shown and attendance was above that of last Session.

The Committee are looking forward to an increase in activities in the Oxford area where it is felt a potentiality lies. The December meetings here had an attendance of over 70.

Membership Growth

An increase is shown in membership, especially with Graduates and Students.

Institution "Journal"

Satisfaction is expressed with the *Journal* with its maintained high standard and cross section activities of the profession. The introduction of the loose leaf for vacant appointments in the interest of members appears to be of assistance to the profession in general.

Sheffield

Since co-opting a Graduate member to serve with the Section Committee, a good deal of work has been done with a view to starting a Graduate Section, and meetings of junior members have been held in Sheffield and Rotherham. Efforts are now being made to form a Committee and to promote further activities.

The special meeting held in November to discuss the Harrogate Conference aroused a good deal of interest, and a report on this meeting is being forwarded to the Chairman of Council.

A Productivity Exhibition is being organised in Sheffield by the East & West Ridings Regional Board for Industry and members from the Section Committee are taking part in the preparations.

Owing to the increase in the number of technical meetings being held in the area, it is suggested that some of the lecture meetings be organised as "Joint Meetings" with kindred societies in the area and this idea is being explored with a view to reducing congestion in the fixture list and improving attendance generally.

The Committee have also held a special meeting to consider the Report of the Special Committee on Organisation, and propositions made at this meeting will be further discussed at the next ordinary meeting before being forwarded to Council.

Shrewsbury

During the period under review the Section Committee have met on four occasions, the main items discussed being as follows:

(*a*) The excellent reception of the lecture given by Mr. Lewis C. Ord on the 26th September (attendance 150) and the Committee Members' suggestions for various actions to encourage and maintain increased attendance.

(*b*) The finalising of 1951-52 Lecture Programme.

(*c*) The consideration of Applications for Membership.

(*d*) The discussion and agreement on the proposal regarding "Application for Full Section Status," based on the Sub-Section's splendid record since its inauguration in February, 1945. An average of 8.5 Lecture Meetings have been held per Session with an average attendance of 36.8.

(*e*) The consideration and discussion regarding the documents on the proposed Reorganisation.

The October lecture given by Mr. P. A. Champion on "Ball and Roller Bearings Manufacture and Application" was very well received and followed by a keen discussion. The November lecture given by Mr. F. E. Rattlidge, A.M.I.Prod.E., was also greatly appreciated by approximately 80 members and visitors.

South Africa

In September, Mr. T. D. Davidson, of East Rand Engineering Company, delivered a paper entitled "Cost Accounting." As a result of the keen interest

shown, it was agreed to devote an additional evening for further discussion on this paper.

Mr. J. F. Chapman, a member of the Institution, delivered a paper on "Some Aspects of Railway Wagon Manufacture in South Africa" to a meeting held in October. The paper was suitably illustrated.

At the November meeting, Mr. D. S. Claire, A.M.I.Prod.E., Assoc.I.Mech.E., spoke on "The Manufacture of Ball and Roller Bearings," suitably supplemented by slides.

The meeting in December took the form of a Discussion Evening, when further aspects of Mr. Davidson's paper on "Cost Accounting" and associated problems were discussed.

During the last quarter four members were recommended for acceptance.

Southern

During the quarter four very successful lecture meetings were held, one of which was at Portsmouth. The Portsmouth lecture was the first held in this district and was well supported. The attendances in Southampton show a marked improvement.

The Committee have given considerable attention to the Graduate activity with a view to the formation of a Graduate Section and to encourage this it is proposed to organise a series of works visits, commencing with a visit to Vauxhall Motors at Luton on 14th January.

Nominations have been invited for four vacancies on the Section Committee. The date of the Annual General Meeting has now been fixed for 7th March, to be held at the Polygon Hotel, Southampton, at 7.30 p.m.

It has been arranged that the Section will hold a Dinner-Dance, this to take place at the Polygon Hotel, Southampton, on 9th April, 1952.

Stoke-on-Trent

During the period under review the Section has held regular monthly lecture meetings. These have been interesting and well attended.

The formation of a Graduate Section in Stoke has been discussed by the Section Committee, but it was decided not to pursue this matter at the present, owing to the fact that there are insufficient junior members in the area.

A member of the Stoke-on-Trent Sub-Section has entered for the Schofield Travel Scholarship for 1952.

Sydney

Local Activities

At the Annual General Meeting held in October, Mr. C. E. Jones was elected President of the Sydney Section and Mr. J. E. Strick, Vice President. During the course of the evening the retiring President, Mr. E. G. Bishop, presented his Presidential Address, the subject being "Early Engineers." This well prepared paper proved most interesting and was very well received. The October meeting concluded the lecture programme for the year. It is felt that the programme has been an interesting one and of benefit to those attending.

Research—Working Groups

The Working Group established under the Chairmanship of Mr. C. S. Curtis has now had several meetings, and good work has been done in preparation for the survey which is to be conducted with approximately 150 of the leading engineering firms in New South Wales. It is hoped that the results of this survey will show what use is being made of basic engineering standards in drawing office practice, and that it will greatly influence many firms to profit by the use of these basic standards.

Membership Growth

The strength of the membership at present totals 195.

Education

This year at the Sydney Technical College there were 60 Students enrolled in the various stages of the Production Engineering Diploma Course. Five of these

students sat for their final examinations in Stage V and if successful will be the first to complete the course at the Sydney Technical College.

In the certificate course in Production Engineering there were 110 Students enrolled. The certificate course is a new Course and next year the successful candidates in Stage V will be the first to graduate.

Western

The Section has now held five lectures, three of which have been in Bristol, one in Chippenham and one in Gloucester. All of them have been very interesting and on a variety of subjects.

The lecture at Gloucester was a joint effort with the Gloucestershire Engineering Society and Mr. Loxham gave a very interesting talk on " Mechanical Gauging and Inspection," whilst the lecture in Chippenham was held at the Westinghouse Brake and Signal Co., Ltd. Works in conjunction with their Discussion Group. This lecture, which proved to be very instructive, was given by Mr. T. B. Worth, on " Production Engineering as a Career."

The Committee have now given some attention to the Special Report issued on the suggested re-organisation of the Institution and one Committee Meeting was devoted entirely to this subject.

Western Graduate

The Graduate Section have now completed arrangements for the 1951-52 programme, and although there was a late start very good progress has been made. The first lecture in November was given by Mr. R. O. Jeakings to an audience of approximately 50, which was considered a very good attendance for a first meeting.

It has been decided to hold a " Brains Trust " and a " Lecturette " Competition.

The Trust will be provided by members of the Senior Section Committee, who will also provide the two prizes for the " Lecturette " Competition.

Special attention is being given to the various competitions which have been organised, and it is hoped that some entries will soon be forthcoming for the Lord Austin Prize.

Wolverhampton Graduate

The last quarter for 1951 has seen much activity for the Graduate Section.

A lecture on " Air Operated Fixtures " was given by Mr. C. M. P. Willcox, and a lecture on " Industrial Incentives " was given by Mr. R. N. Marland. A film and talk on the subject " Hard Metal " was given by a technical representative of Protolite Ltd. These lectures were well received by a large attendance of Graduates, Students, and visitors.

Works visits were made to Talbot Stead Tubes Walsall Ltd., and the British Electricity Authority's New Generating Station, Walsall. The visits proved to be most interesting and were well attended.

The Graduates held their Annual Autumn Dance in November, when 160 Graduates and friends enjoyed a very pleasant evening.

The Study Group has also completed its report, which has been passed to Head Office.

Yorkshire

The first half of the 1951-52 Session has now been completed and the three meetings held have been successful. The average attendance has been 85, and the subjects dealt with have been of great interest to the majority of members.

The Section President, Mr. F. T. Nurrish, has sent a letter to every member of the Yorkshire Section, giving details of the remaining meetings that are to be held, and in our opinion this method of keeping the members informed of activities has helped considerably to make the season so far a success.

The Section Committee have considered the proposed re-organisation of the Institution and, in general, are in agreement with the proposals.

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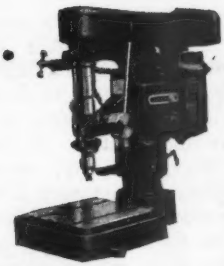

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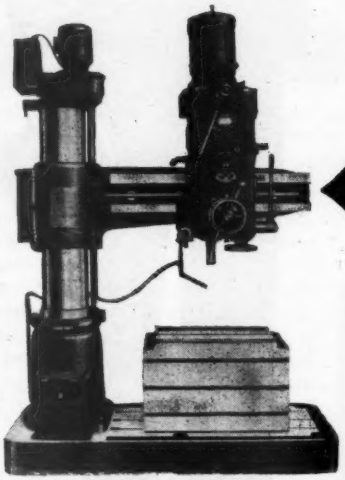

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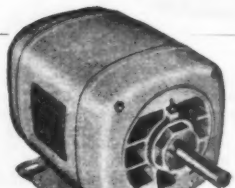

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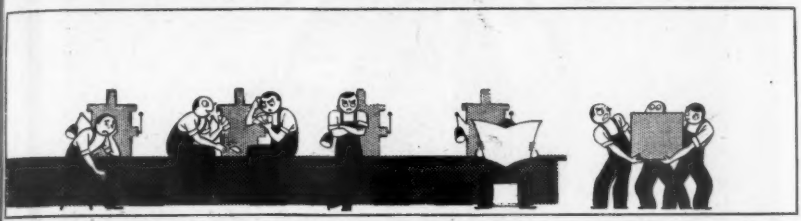

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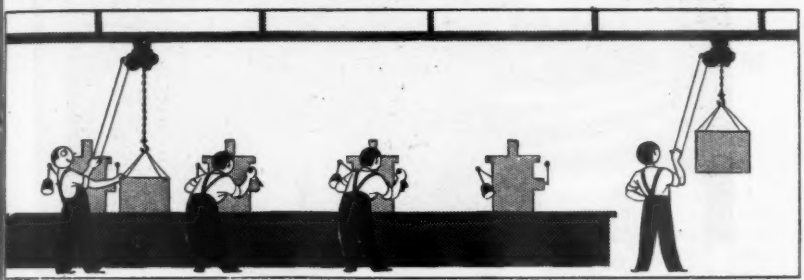

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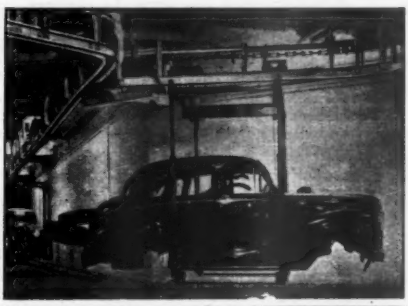

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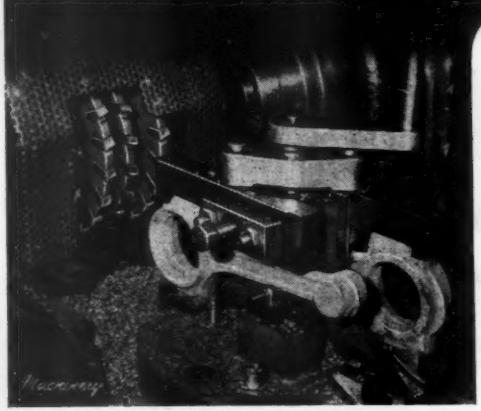

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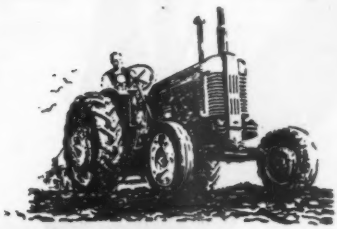

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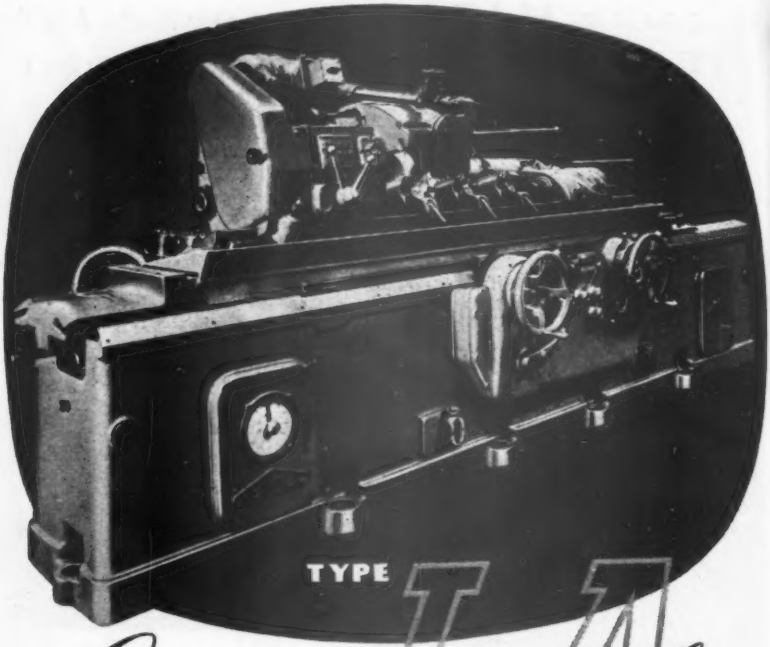

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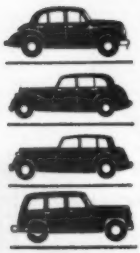

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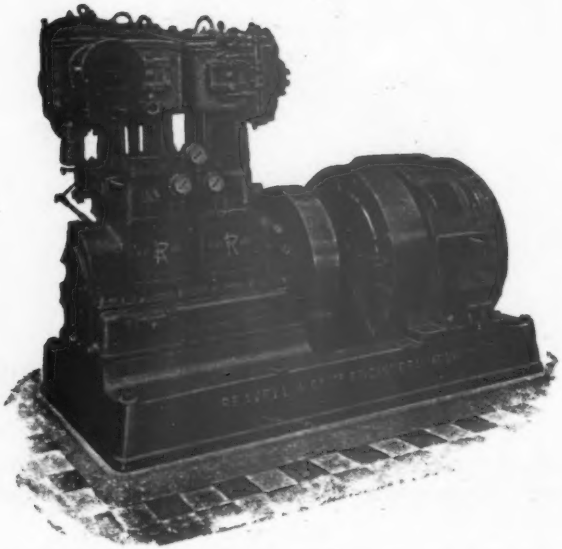

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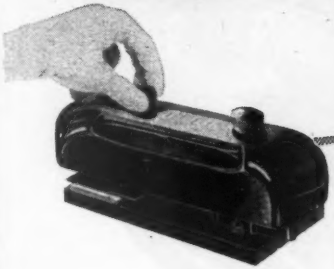

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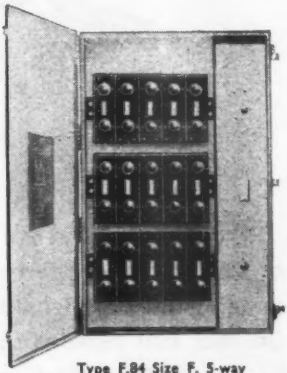

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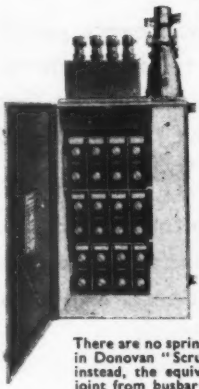

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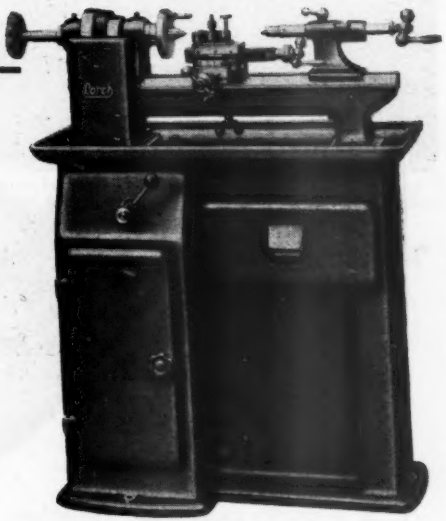

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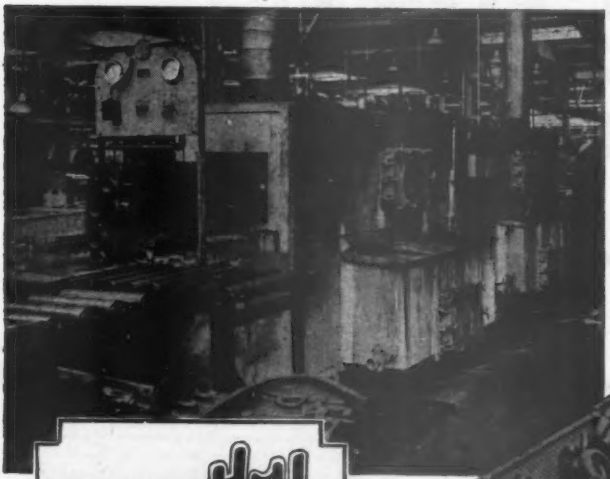

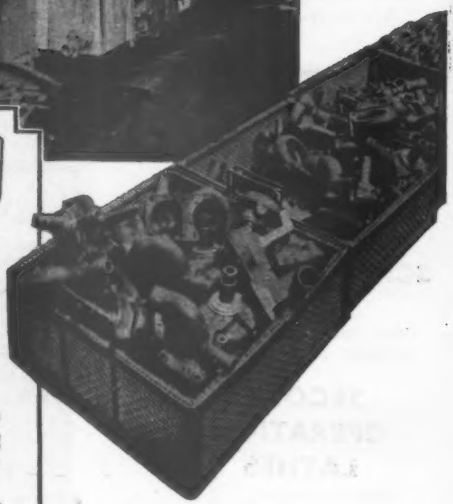

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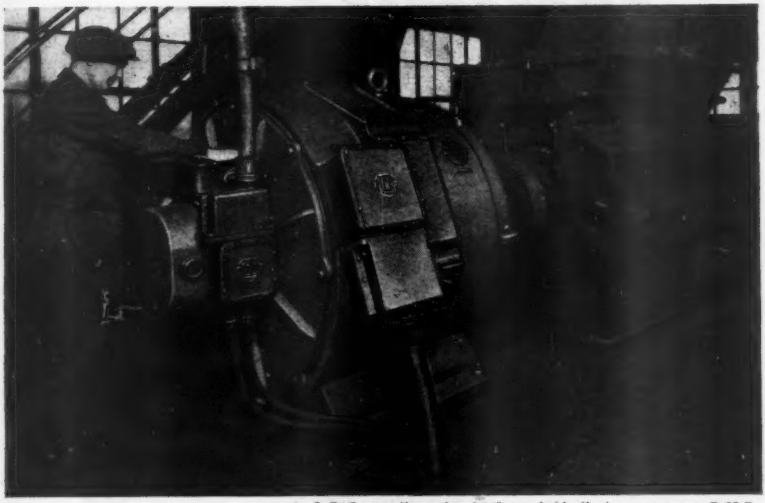

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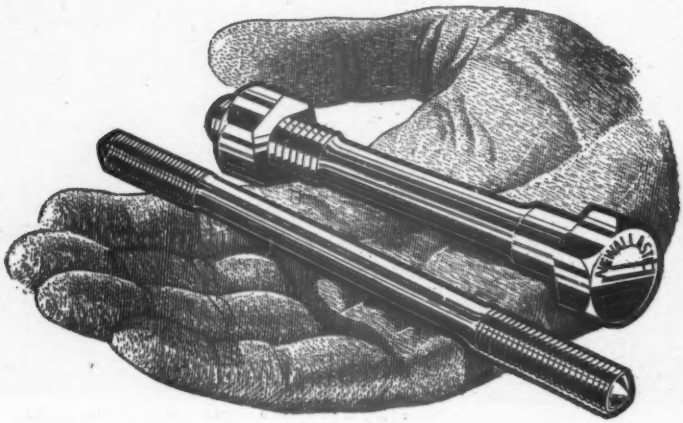

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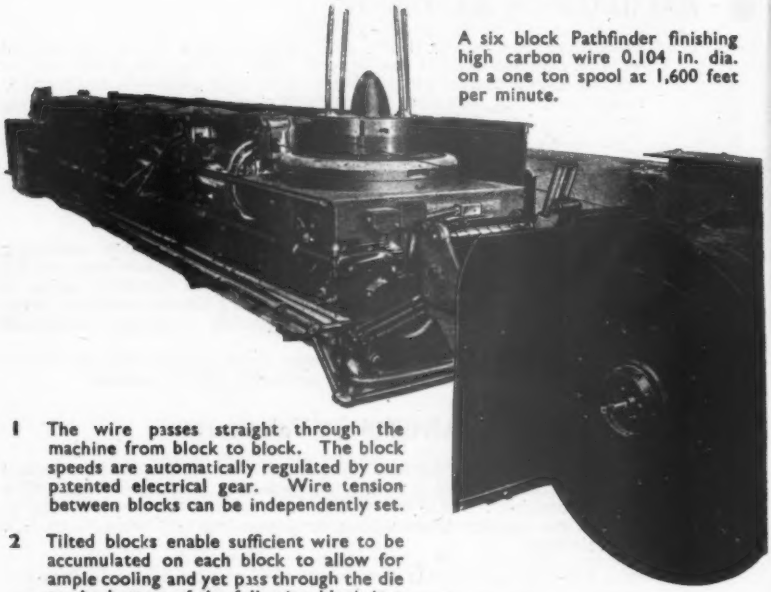

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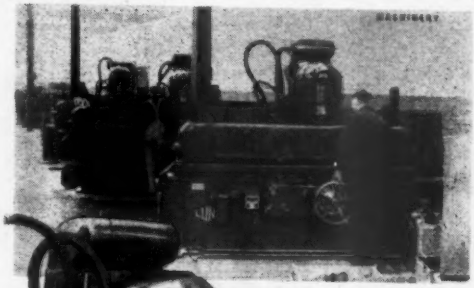

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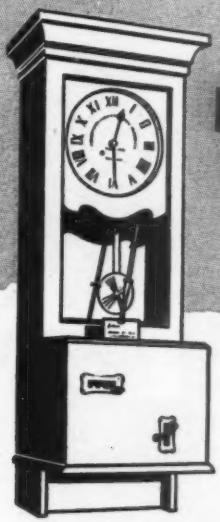

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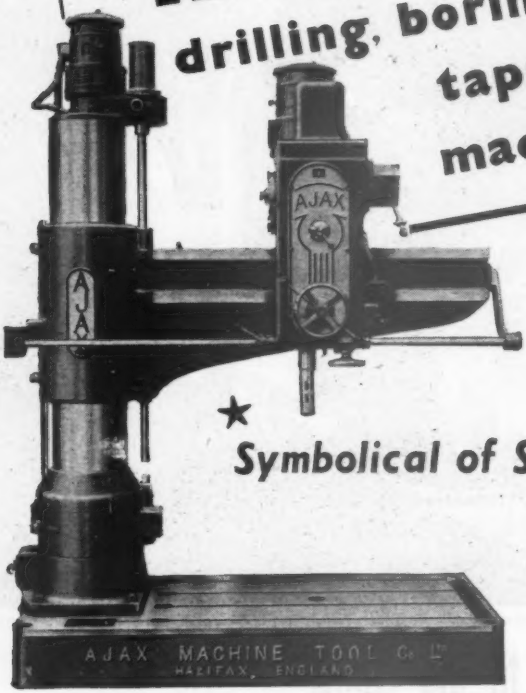

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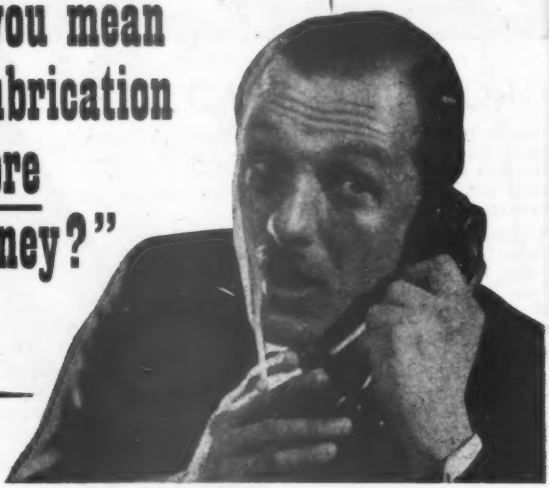

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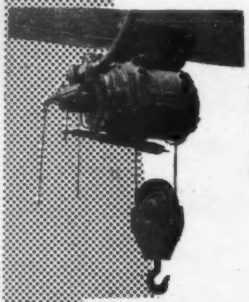

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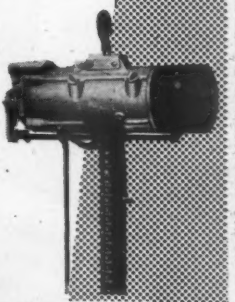

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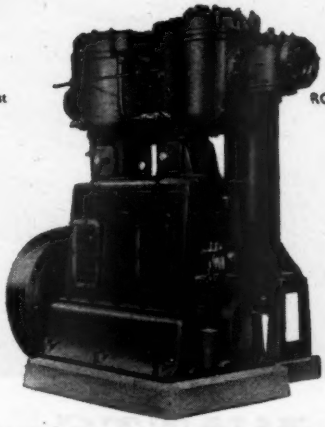

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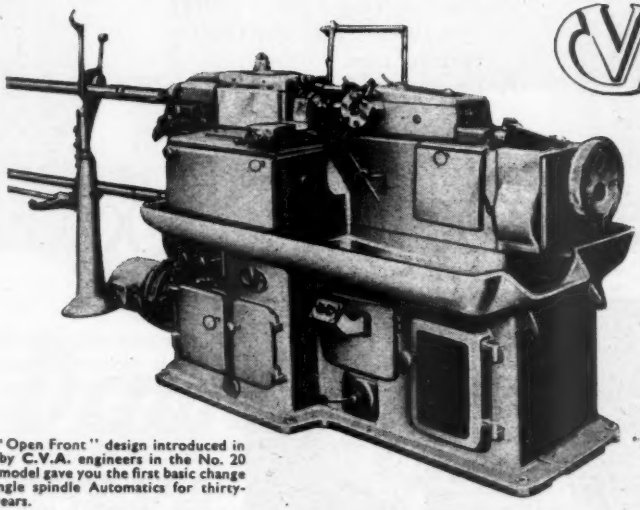

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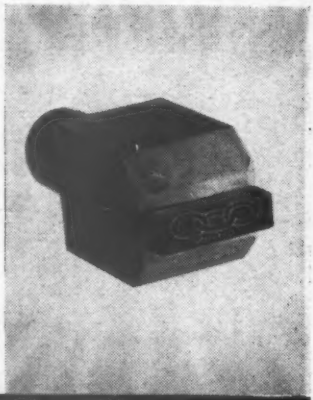

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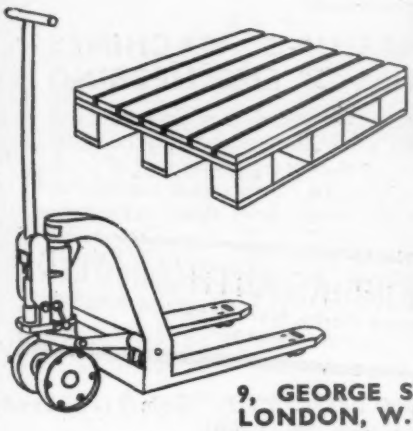

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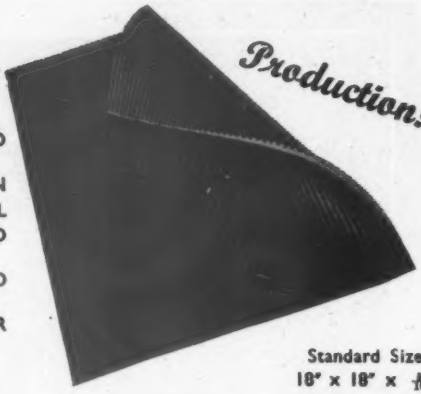

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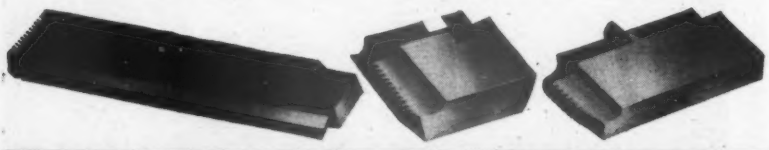

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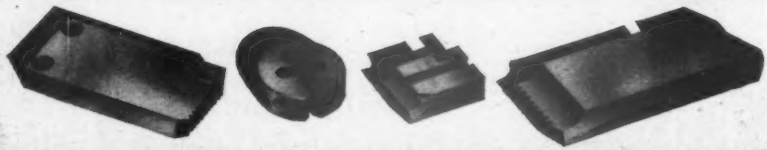

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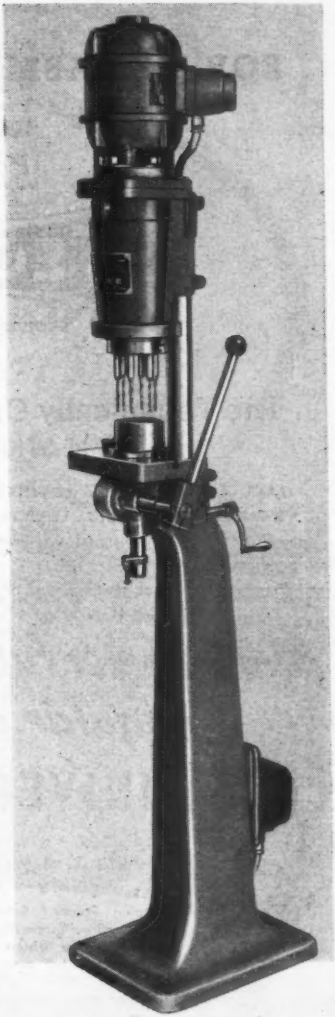

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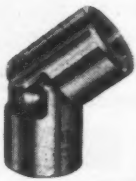

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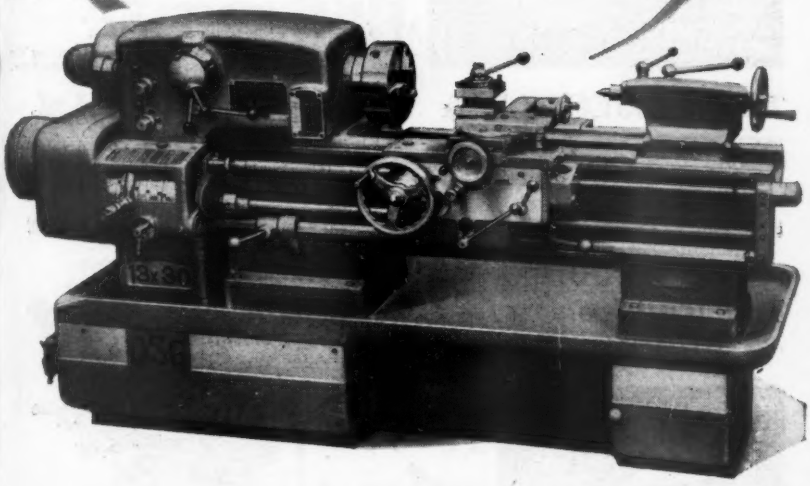

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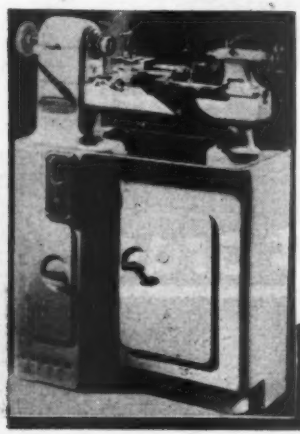
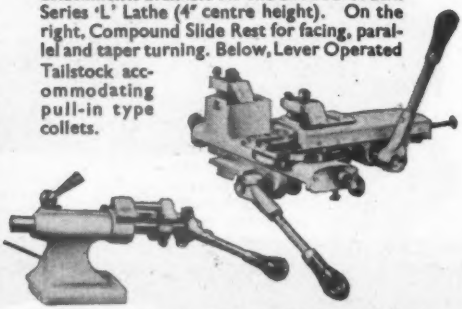


Here are two of the many interchangeable attachments available for the Smart & Brown Series 'L' Lathe (4" centre height). On the right, Compound Slide Rest for facing, parallel and taper turning. Below, Lever Operated Tailstock accommodating pull-in type collets.



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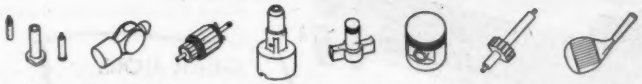

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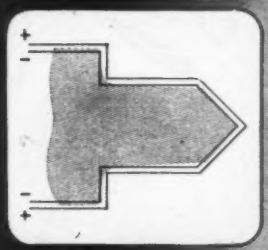

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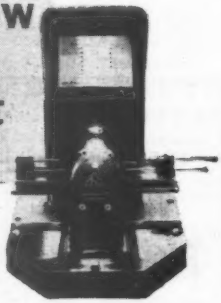

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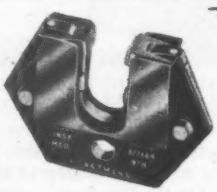

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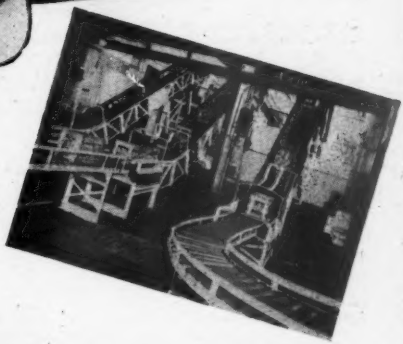

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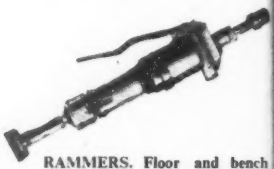

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